Multinational corporations' knowledge transfer in China: A multiple-case investigation of two industries

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MULTINATIONAL CORPORATIONS' KNOWLEDGE TRANSFER IN CHINA: A MULTIPLE-CASE INVESTIGATION OF TWO INDUSTRIES

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ABSTRACT

This thesis examines the practices of knowledge transfer and organisational learning carried out in four foreign invested firms and their impacts on firms' competitiveness in the Chinese telecommunications manufacturing industry and automotive industry. The weakness in the literature on multinational corporations' (MNCs) knowledge transfer, in particular to transitional markets, is analysed by examining: the categorisation of types of the transferred knowledge; the modes and routes of transferring knowledge within these MNCs, the process of utilising the transferred knowledge in the recipients based on organisational learning, and the key factors in affecting knowledge transfer and organisational learning in the Chinese market.

Based on our investigations in these firms, it reveals that the transferred knowledge includes not only technology and management skills as commonly known, but also social knowledge that helps to shape the vision and atmosphere of the affiliates established in the new market. Knowledge transfer and utilisation has been carried out based on a complicated process of organisation learning, which is essential to embedding the transferred knowledge and building up capabilities in the recipient firms in the Chinese market. Individual stages of the organisational learning process, and key factors associated with this process, are discussed, which leads to the understanding of the success of the capability development in these firms in the

characteristic host market. As a further development, this thesis also examines the secondary knowledge transfers from the four firms to their own subsidiaries, also located in China, and the reverse learning by their parents, which follow as a result of successful knowledge utilisation and development in these four firms themselves.

The extension of MNCs' firm specific advantages into China is based on a three-tier knowledge transfer and organisational learning process, where the tiers are (1) foreign parents; (2) the four foreign invested firms; (3) their own affiliates and component suppliers in the Chinese market. This represents a new contribution to understanding within the international business literature on generating competitiveness in the transitional markets. The implication is that knowledge transfer and organisational learning serves as the key to MNCs' development in transitional markets, particularly in high-tech industries where the indigenous firms lag far behind in terms of technology and management.

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GLOSSARY

CKD:	Complete Knock Down, means that all or most of the components of certain product, are transported from the supplier, usually the parent firm in the case of technology transfer within MNCs, to the recipient for reassembling. As these components are not even partly assembled, it is easy to transport them.
SKD:	Semi-Knock Down, means that some of the components of certain products are partly assembled, and are transported to the recipient in bigger packages for further reassembling. As such, these partly assembled components are not so easy to transport.
BBTEMC:	Beijing Bell Telephone Equipment Manufacturing Co. Ltd
BOT:	Acronym of Build-Operate-Transfer. It is a special form of export of both products (i.e., hardware, such as equipment, components, etc.) and services (i.e., software, such as know-how, training, etc.)
CDMA:	Code Division Multiple Access technology
CLSI:	Customised Large Scale Integration
DSS1:	Digital Signalling System Number 1
GSM:	Group Special Mobile or Global System Mobile.
IN:	Intelligent Network
INAP:	Intelligent Network Access Protocol
ISDN:	Integrated Service Digital Network
KL:	Kilo Lines
MRPII:	Material Management System
NEATC:	North East Asia Telecom Co. Ltd
PBM:	Printed circuit Board Manufacturing
PCB:	Printed Circuit Board
PPM:	Piece Parts Manufacturing
PRTEC:	Pearl River Telecom Equipment Co. Ltd
SAKHC:	Shanghai Alcatel Kang Hua Cable
SBAMC:	Shanghai Bell Alcatel Mobile Co. Ltd
SBB:	Shanghai Bell Belgium
SDH:	Synchronous Digital Hierarchy
SMD:	Surface Mounted Device
SSA:	Small Stand Alone (exchange)
TEDA:	Tianjin Economic and Technology Development Area
TEMIC:	Shanghai TEMIC Microsystems Co. Ltd

Chapter 1 Introduction

1.1 Overview

After two decades of economic reform, China is now regarded as a lucrative target for international business enterprises and for international business researchers alike. Since the end of the 1970s, foreign direct investment (FDI)[1] has been strategically utilised by the Chinese government as tool for spurring economic development, whilst China's debt-burdened state-owned enterprises are plunged into crisis. Second only to the USA in terms of FDI inflow since 1993, China is quickly emerging as one of the most important investment sites around the world. The accumulated actual utilised foreign capital in China, from 1979 to 1995, amounted to 250 billion US dollars, of which 115 billion US dollars accounted for foreign loans, and 135 billion US dollars, foreign direct investment (Zhang, 1996). In the year of 1996, the amount approached 50 billion US dollars, of which more than 40 billion US dollars is FDI, enabling China to continuously occupy the first place among the developing countries. The years 1997 and 1998 have witnessed similar volumes of FDI entering the Chinese market, registering 48.3 billion and 45.6 billion US dollars respectively

[1] Foreign direct investment is measured as the financial value of an investing firm's interest in a foreign affiliate. A foreign direct investment exists when at least ten per cent of an affiliate's voting stock is held by a foreign parent firm. Foreign direct investment is the hallmark of a multinational enterprise, and indicates the desire to exercise effective control in the management of a foreign affiliate (International Monetary Fund (IMF), 1977; Organisation for Economic Co-operation and Development (OECD), 1992)

(FT, 1999). As a result of the tremendous FDI inflow, China's foreign exchange reserves are among the highest in the world and have surpassed 150 billion US dollars at the end of August, 1999 (FT, 1999).

Along with the huge FDI inflow to China, hundreds of thousands of advanced technologies and patents have been transferred, managerial expertise offered, and international practices introduced. Knowledge transfer and utilisation has played an essential role in continuously promoting China's economic efficiency and, as a result, increasing its share in world markets, based on the strengthening of China's industry competitiveness. However, the practice of managing knowledge transfer through FDI into the Chinese market remains far from clear (Strange, Kamall and Tan, 1998). In particular, no research has been conducted to date on the process of carrying out knowledge transfer and organisational learning by affiliates of multinational companies (MNCs), to achieve competitiveness in this transitional market. In order to shed light on this subject, this research will investigate the knowledge transfer practices of multinational firms entering into the telecommunications and automotive markets in the People's Republic of China.

1.2 Rationale of the study

World markets are increasingly open to multinational corporations (MNCs). Foreign direct investment in a market is the most risky form of entry because it carries the highest capital risk (Buckley and Ghauri, 1993), especially in the very beginning. The ability to create, develop, protect and transfer knowledge within a worldwide

network will be the key basis for competitive strength as cheap labour loses its allure for investors (FT, 1998a). The literature on international business elaborates on the imperative of carrying out knowledge transfer within the process of internationalisation. This is in part a response to the cultural and economic barriers of new markets and intense external competition. Knowledge transfer by MNCs is the essence of developing firm specific advantages, and therefore is central to building up corporate competitiveness, protecting and further increasing MNCs' market share in host countries.

The global telecommunications industry and automotive industry are in the process of restructuring after decades of intense competition. A promising opportunity is now available to MNCs to compete worldwide in both mature and newly established markets. China is now the greatest potential telecommunications market in the world. It starts with a low telephone density per 100 persons in the population (a teledensity of 4 per cent in 1994) and has an ambitious development target. The Ministry of Post & Telecommunications of China plans to double the number of lines to 170 million during its 9th Five-Year plan (1996-2000). Based on exponential rate of growth (45% during 1991-1995. Engardio, *et al*, 1996), this will represent a total investment of 58 billion US dollars. FDI has been a major vehicle for searching market share in China since 1978. A Chinese official investigation (Wu, 1995: 11) shows that "more than 40 telecommunications equipment production enterprises funded jointly by enterprises attached to the Ministry of Posts and Telecommunications and overseas businesses" have been established up to 1995. Most of world telecommunications producers, such as Northern Telecom Limited of

Canada, Nokia of Finland, Alcatel Alsthom of France, Siemens of Germany, NEC and Fujitsu of Japan, Philips Communication Systems of Netherlands, Ericsson of Sweden, GPT of UK, Motorola of US, are involved in the Chinese market. A very similar picture can be found in China's automobile industry, which also experienced rapid expansion in the past decade. Again major car producers of the world, e.g., Volkswagen (VW), General Motors (GM), Chrysler, Citron, and Honda, all have poured resources into the Chinese market. In exchange for market access, China expects companies to produce locally and transfer know-how in a full range of sectors (Engardio, *et al*, 1996: 21). In the last eighteen years, the Chinese government's strategy for developing the telecommunications equipment industry and automotive industry has met with considerable success (Andersen Consulting, 1997; Wu, 1995). This strategy has relied upon FDI from major international firms competing with each other as producers in the Chinese market. The overall competitiveness of China's telecommunications manufacturing industry, as well as its automotive industry, has improved tremendously. It is evident that knowledge transfer and organisational learning has been crucial, and FDI has been fundamental to what has been achieved.

1.3 Objective of the research

The overall objective of this research is to make an empirical and theoretical contribution to our understanding of the knowledge transfer practices within MNCs and their implications for the general competitiveness of affiliate firms in the transitional markets. This research intends, based on case study methodology, to

provide a detailed analysis of the process of knowledge transfer and organisational learning carried out by MNCs in the Chinese market. Based on existing theoretical frameworks (Bartlett and Ghoshal, 1989; Chang and Rosenzweig, 1995; Cohen and Levinthal, 1990; Davidson and McFetridge, 1985; Doz, 1980; Gupta and Govindarajan, 1991; Hedlund and Riddertråle, 1994; Inkpen, 1995a and 1995b; Kogut and Zander, 1993; Nelson and Winter, 1982; Nonaka and Takeuchi, 1995; Porter, 1990; Sohn, 1994), this research intends to analyse the process of MNCs' knowledge transfer and organisational learning, by which foreign subsidiaries develop from "fresh" entrants to becoming competitive players in China's telecommunications equipment market and automotive market. In doing so, the following questions will be addressed: What knowledge has been transferred by the MNCs into the Chinese market? How has the knowledge been transferred? How has the transferred knowledge been utilised? And, what is the impact of the Chinese business environment on MNCs' knowledge transfer?

1.4 Significance of the research

The significance of the proposed research lies in the fact that:

(1) The subject of knowledge transfer has until recently received little attention in international business academic circles. Furthermore, the role of FDI in transferring knowledge to firms located in economies in transition has not been adequately addressed (though Clegg, Kamall and Tan (2000), have attempted this for Matàv in Hungary). This topic is assuming greater importance as more countries embrace economic liberalisation and open their doors to foreign investment as a means to

upgrading their economies. The present study addresses the literature weaknesses on MNCs' knowledge transfer by exploring the following issues: the categorisation of the transferred knowledge; the management of knowledge transfer and the utilisation of the transferred knowledge through a deliberate process of organisational learning in the recipient firm. Each of these topics is developed in the context of transition economies, in an attempt to take a step forward from the literature dominated by research on developed countries.

(2) MNCs have always been puzzled by the question of how to cope with the distinctive Chinese market (Child and Lu, 1996). There is no doubt that China has progressed significantly towards achieving a market economy (Chang and Nolan, 1996). However, the Chinese market remains distinct from western markets politically, economically as well as culturally. FDI in China presents many challenges to western business practice as well as to our current modelling of FDI strategy and its implementation. First and foremost, key issues concern how to cope with the highly distinctive institutional and cultural characteristics of the host country. In essence, knowledge transfer concerns not simply the transfer of scientific technology, but also other types of knowledge that are essential for success in the Chinese market. This study concerns how firms have managed this process. In doing so, it draws on, and refers heavily to, the mainstream international business literature and that on the management of knowledge transfer and organisational learning. This research, therefore, presents an opportunity to test the validity of the existing literature on penetrating transitional markets by MNCs based on knowledge transfer.

(3) The world telecommunications services market is in the process of liberalising. As one of the industries supplying established and new entrant operators, the telecommunications manufacturing industry is experiencing intense international competition. For its part, the world automotive industry is also undergoing restructuring. The emerging markets are becoming the final battlefield for the survival of MNCs in an over-supplied industry. MNCs in these two industries are experiencing conditions of change for both demand and supply-related reasons. As intermediate and final product markets become more globalised (less segmented into national or regional markets), knowledge transfer and organisational learning inside MNCs is seen as a crucial step to maintain and enhance their competitive advantages in newly opening markets.

In summary, this study intends to examine the process of managing knowledge transfer and organisational learning, within MNCs, in the context of coping with the distinctive Chinese market. It aims to extend our understanding of the management of knowledge transfer into a distinctive transitional economy within the general framework of international business.

1.5 The research process

In order to achieve the aim set out above, a multiple-case study design, based on cross comparative analysis, was chosen. This approach is used to carry out a detailed, but also relatively comprehensive, investigation of the knowledge transfer process of MNCs in both the Chinese telecommunications manufacturing industry

and automotive industry. As described by Yin (1994: 44), multiple-case design contains more than one single case of analysis in the same investigation, and thereby permits a comparison across cases. The evidence from multiple cases is often considered more compelling, and the overall study is therefore regarded as being more robust (Herriott and Firestone, 1983). Research findings resulting from such research are considered much solid in respect of validity, and much more reliable in the context of future applications.

This research relies on multiple sources of evidence gathered in several stages. The main sources of data include: (1) publicly available data, including company annual reports and press articles; (2) firms' internal documents (when available), such as newsletters, strategic plan reports and evaluation report, many of which were confidential; (3) data collected from the nearly thirty face-to-face interviews conducted in three field trips (two to China and one to Belgium). These data complement each other and also permit verification of factual material, therefore increasing confidence in the data.

The whole research can be divided into three phases. In Phase One, great efforts were made to investigate the relevant literature up to date, to identify the research objectives of this study, and to assimilate the secondary data available on the chosen industries. Once we had developed an understanding of the milestones in the evolution of MNCs' operations in the Chinese telecommunications manufacturing and automotive industries, a list of 39 firms were selected and contacted to seek access in order to carry out case study research. In Phase Two, 9 firms deemed to be

suitable for this research were visited and a mixture of open-ended and semi-structured in-depth interviews were carried out to fill in the gaps found in the previous investigation. This deepened our understanding of MNCs' knowledge transfer process in the two industries in China, and enabled comparison of the differences between the knowledge transfer practices among these firms. Based on the results of the first fieldwork, 4 firms (two in the telecommunications manufacturing industry and two in the automotive industry; geographically, two from Europe and two from North America) were identified as the case subjects for further research. At this point, a second round of in-depth interviews was launched in these firms in China, based on the refined questionnaires developed through the previous fieldwork, to collect the data required for this project, including one research visit to Belgium. Finally, in Phase Three, all the data collected and reports drawn in the second phase were reassessed in line with the criteria and procedures set for qualitative research in general (Lincoln and Guba, 1985; Strauss and Corbin, 1990), and case study methodology in particular (Yin, 1994), to identify factors contributing to the successful and unsuccessful execution of knowledge transfer. Then, cross-case conclusions were reached based on the analysis and research finding from Phase Two. This research procedure is designed to accord with the guidelines for qualitative research and good practice in case study methodology. The aim is to place the research on a solid base in terms of validity and reliability.

1.6 The organisation of this thesis

The thesis is divided into eight chapters. After outlining the research objectives and rationale in this chapter, Chapter 2 overviews the relevant mainstream literature on the theory of international business, knowledge transfer and organisational learning. This chapter combines these literature to produce an analytical framework for our examination of the issues on the research subject in the context of MNCs' investment in the Chinese market. Chapter 2 also presents the research questions intended to guide this study towards achieving the objectives set out at the beginning. Chapter 3 reviews the historical development of FDI in China with an emphasis on its policy aspects. This presents the general background of FDI in China, against which this research has been carried out. Chapter 3 also presents the two chosen industries of this investigation: China's telecommunications manufacturing industry and the automotive industry. Chapter 4 follows on by narrowing the focus down to the particular level of the four firms included in this study. Chapter 5 explains the methodology chosen and the research process adopted, to achieve the goal of the soundness in the research, in line with the requirements for empirical studies in international business. The next two chapters present the findings of this research. Chapter 6 focuses on issues relating to the typology of the transferred knowledge and the approaches to transferring them; Chapter 7 analyses the process of organisational learning, revealing the key factors found in the above process, examining the impact of the Chinese business environment on the practices of knowledge transfer by MNCs, and the contribution of knowledge transfer and organisation learning on firms' competitiveness in the Chinese market. Chapter 8

then evaluates the entire research results against the objectives set out before, the managerial implications of these findings, and provides some recommendations for future research.

1.7 Summary

The overall objective of this research is to make an empirical and theoretical contribution to our understanding of the process of knowledge transfer and organisational learning within MNCs with affiliates in China based on case research. Implications for competitiveness are also explored. This chapter has outlined the rationale of this research and the process by which the research objective has been achieved. It has also introduced the organisation of the whole thesis. This study can be seen as a test of the relevance of existing academic tools to examining the process of transferring MNC's firm specific advantages to transitional markets. The study of globalisation in international business research, and the assimilation of transitional economies into the global economy, mean that this case research on the experiences of several MNCs in China is a timely enquiry. It represents a new effort of tackling the issues on establishing firm competitiveness in transitional economies that is at the core of international business study in the 1990s.

Chapter 2 Literature Review

2.1 Introduction

The topic of knowledge transfer arising from FDI has received little attention in the academic literature on international business. In the main, the literature has preferred to concentrate on the benefits of FDI that can be ascribed to formal resource transfers, especially those involving scientific technology. For many years this emphasis appeared to be justified when studying FDI into the less developed countries[2] where the main issue was always seen to be an absence of national technological capacity in basic industries. The issue of the transfer of skills was a separate subject within the preserve of organisational studies and the human resource literature.

The majority of existing research is pitched at the level of broad macro policy, and is overwhelmingly economics or political science-based. However, in practice, the international private sector is already generating radical change in eastern and central European countries in the first half of the 1990s and, now, in China. Of all the private sector agents of change, it is foreign direct investors who exert, and who will exert, the most immediate and tangible impact on corporate performance in the

[2] Such studies constitute the bulk of existing research on the transfer of technology.

emerging markets and economic upgrading through the transfer of knowledge and organisational learning. However, too little is known about the process.

The intellectual challenge to this lacuna in the literature has come from the worldwide trend towards market liberalisation, and from the widespread ascendancy of economic policies based on market economics over that of state monopoly and central planning. The liberalising Central and Eastern European Countries (CEECs) and China have become test beds for the use of FDI to transfer skills to economies in transition. It can be argued that the rate of transfer of technological, managerial and organisational skills, is the binding constraint for the upgrading of economies. For these countries, their economic target is to attain comparable national outputs and economic structures to those in the developed market economies. Knowledge transfer and utilisation carried out by FDI is crucial to these ambitions.

There are two leading objectives in this chapter. The first is to reappraise knowledge transfer and to link it specifically to the act of foreign direct investment. The second is to derive an analytical framework on examining knowledge transfer by FDI to transition economies from this appraisal, which will be employed in the case studies of foreign invested firms in the Chinese telecommunications manufacturing industry and automotive industry.

2.2 Knowledge transfer and international business

2.21 A definition of knowledge, knowledge transfer and organisational learning

In the context of management research, the term *knowledge* is used with a different meaning from *information*. Information is organised data: data relating to the current or past state of some business activities that have been collected, filtered and organised according to some set of rules. Knowledge refers to the tacit or explicit understanding in a firm about the relationships between phenomena, structured in a more or less scientific manner (Hedlund and Nonaka, 1993: 121). It is embodied in routines for the performance of business operations (Nelson and Winter, 1982: 99), in organisational structures and processes, and in embedded beliefs and behaviours. Knowledge implies an ability to relate inputs to outputs, to observe regularities in information, to codify, explain and, ultimately, to predict. As Nonaka and Takeuchi (1995: 8) assert, knowledge differs from information in being concerned with beliefs, commitment to a purpose, and with actions and meaning.

Knowledge transfer refers to knowledge communicated from one agent to another, such as from one individual to another, or from a group to an entire organisation (Hedlund and Nonaka, 1993: 123). It may happen within or between firms across national borders, but it could equally be between different institutions in the same country (Dunning, 1993: 289). In this study, we focus (but not exclusively) on knowledge transfer as intra-firm knowledge communication and exchange, i.e.,

knowledge communicated from one part of a multinational corporation to the other part of the same firm.

The concept of organisational learning refers to the development of skills, knowledge, and associations between past actions, the effectiveness of those actions, and future actions (Fiol and Lyles, 1985). After the seminal work by Cyert and March (1963), organisational learning has been given lots of attention in the strategy literature (e.g., Ghoshal, 1987; Huber, 1991; Lall, 1980; Lyles, 1988). In fact organisation itself can be viewed as a learning system (Nevis, Di Bella, and Gould, 1995). The development of firm skills through a learning process involves the interpretation of past experiences and strategy choices as a basis for present and future actions (Porter, 1991). The knowledge generated through learning supports a firm's ability to understand the consequences of past actions and respond to environmental stimuli. Thus, effective learning results in an enhancement of an organisation's skills and capabilities (Levinthal, 1991).

2.22 Knowledge transfer and international business

In the context of international business, knowledge is not a new concept[3]. On the contrary, it has long been identified as a key part of the firm's comparative advantages in doing business in foreign markets. Stephen Hymer made the founding contribution to what has become known as the Industrial Organisation Approach

[3] The closest approximation to an intellectual link between the conventional economics-based literature on technology transfer and that on knowledge transfer is to be found in the writings of researchers on the economics of international transactions. For instance, Hennart (1988) proposed that the tacit component of technology is transferred more efficiently if the transferor and the recipient are under common ownership.

(Dunning, 1993). His identification of the international firm as a firm that "internalises or supersedes the market" (Hymer, 1960; 1976: 48) provided a useful prologue to the theory of internalisation as a means for transferring knowledge, business techniques and skilled personnel (Hymer, 1960; 1976: 69). Hymer realised that firms must possess[4] some kind of innovatory, cost, financial or marketing advantages that are sufficient to outweigh the disadvantages faced when competing with indigenous firms abroad via local production. The incoming MNC lacks local market knowledge, which puts it at a disadvantage compared with local firms. However, foreign direct investment involves the transfer of a package of resources[5] (technology, management skills, entrepreneurship, and so on), and not merely financial capital. It is the transfer of firms' ownership advantages in these inputs that enables their subsidiaries to be competitive in foreign markets.

In effect this approach, initiated by Hymer (1960; 1976) and promoted by Kindleberger (1969), sees the foreign MNC compensating for local disadvantages through the transference of firm-specific advantages, that allowed it to cross-subsidise foreign production, and to be competitive in the first instance. Empirical research by Dunning (1958[6]), which strongly influenced Hymer, had already identified the tendency of US multinationals to invest in the UK in technology and capital-intensive industries. Later, formal cross-sectional statistical research dating from the early 1970s (e.g., Caves, 1971) initiated a large body of empirical literature

[4] With some degree of monopoly. Accordingly, these were referred to as 'monopolistic advantages'.
[5] An illustrative list would be: patents, technical know-how, financial resources, access to (and knowledge on how to build up) skilled professional and managerial personnel and teams, marketing and distribution systems.
[6] The revised and updated edition of this classic research (Dunning, 1998) demonstrates that the basic thesis of the study remains valid forty years later.

that reconfirmed Dunning's observations and Hymer's theory using different datasets, though still dominated by US data. Hymer's original definition of the transferred resources within MNCs is much wider than that of scientific technology. However, until the 1980s, it was technology that became the undisputed focus of research.

In 1968 Harry Johnson (Johnson, 1968) noted that there were four means for the international transfer of production, each of which is based on the transfer of knowledge: (1) Imitation abroad; (2) The oligopolistic product life cycle, where direct investment prevents foreign competition (i.e., where FDI is employed to reduce oligopoly interaction) (Vernon, 1966; 1971); (3) The sale or lease of technology; (4) Where knowledge becomes a free good through embodiment in standard machinery. This early classification presages the different academic approaches to the transfer of knowledge, and stresses that the routes of knowledge transfer exert on firms.

In Vernon's product cycle model (PCM), the transfer of knowledge within MNCs also played an important role. Vernon (1966) argued that, due to the structure and pattern of US factor endowments and markets, US firms accumulated a kind of competitive or ownership advantages, in particular their capacity to innovate new products and processes which were unmatched by firms of other countries. Gradually, as a given generation of the products of US firms become standardised or mature, the competitive advantages of producing firms change from those to do with the uniqueness of the product *per se*, to their ability to minimise the costs of value-

adding activities and their marketing expertise. As demand becomes more price elastic at home, the need to cut costs to maintain price competitiveness increases. Rising real labour costs in the USA encourage US firms to relocate production abroad, both to mitigate production costs and to service expanding foreign markets. The marketing competence spawns the technology advantage of US firms in their home market, and the maintenance of international competitiveness relies on the effectiveness of transferring these resources across borders to engage in foreign production.

Hymer's approach did not develop an explicit theory of how firm's ownership advantages are generated (Clegg, 1987: 15), and Vernon's theory is a very much descriptive account of US foreign direct investment and trade in the 1950s and 1960s (*ibid.*, p. 24). However, internalisation theory has provided a powerful explanation of the generation of multinational enterprises based on the creation and utilisation of knowledge inside firms across borders (Buckley and Casson, 1976: 33). The internalisation theory approach is distinguished from the Industrial Organisation Approach partially by its emphasis on the creation of knowledge within firms through long-term research and development (Clegg, 1987: 20). Widespread imperfections in external markets (at the levels of the industry, country and firm) mean that there is no perfect external market available for realising the maximum benefits from privately created knowledge. Subject to the normal marginal conditions for choosing between the alternatives of external versus internal market, internalisation by the firm across national boundaries often materialises as the

rational choice, thereby creating (or extending) a multinational enterprise (Buckley and Casson, 1976; 1985).

Internalisation is usually, to some extent, a process of knowledge transfer and utilisation within firms across national boundaries[7]. Internalised flows of knowledge within MNCs are clearly of great importance in accounting for overseas production, and for the fact that MNCs can usually outperform indigenous competitors. Multinationals' superior performance rests on their capability to obtain inputs, which consist of proprietary knowledge (the output of past research and development), marketing know-how (arising from an international or world-wide intelligence system) and financial, management and production experience. These may simply not be available in external markets, or not be available on such favourable terms (*ibid.*, p. 49). It is fair to say that internalisation theory is the underpinning of our following analysis on knowledge transfer and utilisation within MNCs, although the theory is not itself explicit on the process of internalising the market for knowledge itself. Equally, it is true that "The production of knowledge [through research and development] is a lengthy process which requires careful synchronisation with other activities within the firm" (Buckley and Casson, 1993: 48). However, it is not the aim of this research to look at the far wider issue of the production of new knowledge, even though this cannot be fully divorced from the transfer of knowledge.

[7] While the transfer of a monopolistic advantage may not be necessary for an internalised market to be created, at the very least a flow of information will be involved.

Some dynamic perspective on the process of the international internalisation of knowledge markets is afforded by the behavioural literature. This body of research, exemplified by the Nordic School[8], argues that each initial expenditure in a new host has an element that can be re-used in other markets. The behavioural, or stages, approach suggests that internationalisation, and ultimately FDI, is the result of the accretion of firm-specific knowledge in the form of specialised experience. Accordingly, lessons from one market can be transferred to other markets. During internationalisation some portion of expenditures incurred in the internalisation of markets will represent investments. To this extent the knowledge created is an investment that can be re-applied. Davidson and McFetridge (1984; 1985) translate this into a dynamic transactional view of the firm finding that the propensity towards the internalisation of technology transfer abroad by US MNCs varies both with product and positively with previous experience of internal transfers. There is therefore an acceleration in the internationalisation of the firm, and in intra-firm transfers between affiliates. It is possible to conclude that the behaviour of the firm will change after initial internationalisation in step with the progressive significance of firm economies.

John Dunning has made a more explicit contribution to understanding the importance of knowledge in the context of firm's advantages in international operations, especially in the context of FDI by MNCs. The eclectic theory or paradigm (Dunning, 1977; 1993) is built principally on the Industrial Organisation Approach, international economics, and the theory of the firm (internalisation

[8] The behavioural approach to internationalisation is associated particularly with researchers at the University of Uppsala, and in the Nordic countries.

theory)[9]. Within this framework, Dunning has emphasised that in order to explain FDI a number of necessary conditions must be satisfied, none of which on their own are sufficient. Firstly, the investing firm must have some ownership-specific advantages over foreign firms. Secondly, a foreign location must have some locational advantages over the home location. Thirdly, there must be advantages to the internalisation of the market or markets for these advantages, otherwise they, or the rights to use them, would be transferred through non-affiliate contracts, e.g., licensing and franchising. If all three conditions are satisfied, it follows that FDI represents the international transfer of a package of resources to a new location.

The elements of the FDI package normally consist of capital, technology and many different types of skills. These intangible assets are the key items in the transfer of knowledge within multinational enterprises. According to the eclectic paradigm (Dunning, 1993: 77-80), there are two types of ownership specific advantages[10]. The first, denoted as 'Oa' advantages, refer to the "assets" possessed by firms, including tangible assets, such as natural endowments, manpower and physical capital, and intangible assets, such as technology and information, managerial, marketing and entrepreneurial skills, organisational systems, financial capital and access to intermediate or final goods markets. The second type, denoted as 'Ot' advantages, is transaction cost minimising advantages. These arise from the ability of a firm to co-

[9] The earliest drawing together of these strands occurs in Dunning's 1973 review article, predating the first presentation of the eclectic theory in 1977.

[10] The initial definition of ownership advantages is given by Dunning (1977) as capital assets in the Fisherian sense, explained by Johnson (1968) as "Anything capable of generating a flow of income" (*ibid.*: 17). In later work, Dunning (1993) distinguishes ownership asset (Oa) advantages and ownership transactional (Ot) advantages, with the former corresponding to the Fisherian concept, and the latter to the notion of economies of common governance within the firm. However, even Ot advantages will be manifest as a capital value, but indirectly in the valuation of the firm.

ordinate multiple and geographically dispersed value-adding activities, and to capture the gains of risk diversification as a result of the common governance of its core "assets". They are understood to be economies of the firm over the market; however, the extent to which firms enjoy these will vary. Unlike Oa advantages, they cannot be separated from the firm, and the only way that they can be marketed is through the sale of the entire firm to another firm. Other writers similarly concluded that advantages are usually conferred on the firm that internalises the transfer of knowledge (Rugman, 1981; Hennart, 1982).

The eclectic theory places "non-codifiable knowledge" into the 'Oa' category of ownership advantages. This constitutes a 'bank' of human capital experience and know-how relating to the various functions of the firm (Dunning, 1993: 81). Therefore, it is clear the intangible part of 'Oa' is actually knowledge itself, while 'Ot' is the gain from internalising and utilising 'Oa' internationally, via foreign production. Hence, the eclectic paradigm argues that it is not simply the possession of technology *per se* that gives an enterprise an edge over its competitors, but in addition the gains that follow from internalising the use of the technology (Dunning, 1993: 85). It follows that the ability to successfully transfer knowledge and to utilise it within a multinational governance structure is at the centre of attaining Ot advantages internationally.

Kogut and Zander (1993) note that since Hymer's (1960; 1976) thesis was received[11], the central issue in the study of the MNC has been the notion of

[11] Especially since it was widely disseminated by Kindleberger (1969).

monopolistic advantages or, in modern parlance, ownership advantages. The generic O-specific advantage of MNCs is their ability to produce, acquire, master the understanding of and organise the use of technological assets across national boundaries (Dunning, 1993: 290). It is evident that in order to make progress in understanding the crucial role of knowledge in FDI, we have to do more than assign names for the purpose of theoretical classification, however effectively this is done. One way forward is to consider the strategy of the firm, and the role of knowledge in achieving this. Contributions such as the resource-based view (RBV) of the firm (Penrose, 1956, 1958; Wernerfelt, 1984; Barney, 1991; Grant, 1991; Mahoney and Pandian, 1992; Foss, 1997)[12] suggest that focusing on the resources themselves might prove beneficial. The RBV links to transaction cost theory by redesignating the governance gains to the firm (the economies of the firm over the market) as motives for investing in, or acquiring, an asset. The contribution of the RBV to the theory of joint ventures is that it provides a workable model of quasi-integration. It shows how firms can increase the returns on their assets through co-operation with complementary assets owned by partner firms[13].

According to a resource-based view of the MNC, the multinational firm could be characterised as a network of flows of three types of resources: capital; materials; and knowledge (Gupta and Govindarajan, 1991). FDI may thus be viewed as a process of transferring capital, materials and knowledge in order to realise the strategic objectives of the affiliate, and of the parent firm. Parent firms may also

[12] The RBV can be dated back to Penrose (1956; 1958), whose contribution was recognised within the eclectic paradigm.
[13] This point can be related to that on the economies of common governance (Ot) advantages identified by Dunning (1993). The RBV sees the firm as strategically acquiring Ot advantages.

engage in FDI in order to acquire capital, materials, and knowledge from the affiliate, i.e., resources are transferred from the affiliate to the parent company[14]. In practice, even though the initial motive may be for a parent either to provide knowledge to or acquire knowledge from an affiliate, over time knowledge will flow in both directions (Cantwell, 1989; Pearce, 1989; Papanastassiou and Pearce, 1994).

Research has shown that over time affiliates can develop their own local capabilities (Chang and Rosenzweig, 1995; Makino and Delios, 1996). In the context of China and the CEECs, it seems clear that the considerable knowledge gap that exists in every respect (e.g., technology, management skills, organisational capabilities) between the local affiliate and the parent firms in developed economies implies that the production of these local capabilities will be a lengthy process (Chang and Rosenzweig, 1995).

How best to measure a firm's competitiveness is controversial. Buckley, Pass and Prescott (1992), who are interested primarily in the international aspects of competitiveness, argue that 'competitiveness' can be measured by indicators in three groups (*ibid.*, pp. 17-19): (1) competitive performance; (2) competitive potential; (3) management process. The performance of the firm can be assessed by objective indicators such as export market share, export dependency, export growth and profitability. Performance potential can be evaluated through cost competitiveness, productivity, price competitiveness and technology indicators. Performance in

[14] These acquisitive motives for FDI are widespread, and are reviewed under the later section on the motives for FDI. The desire to acquire capital is rarely reported as an *ex ante* motive for FDI. However statistical work demonstrates that, at least between developed markets, the relative home to local cost of capital can influence FDI positions significantly. This occurs via the refinancing of affiliate debt to the parent using local funds (Clegg, 1995).

management processes can be assessed by ownership advantages, commitment to international business, marketing aptitude, management relations, closeness to customer and economies of scale and scope. Each indicator suffers from at least one shortcoming, which is why Buckley, Pass and Prescott (*ibid.*) recommend using a composite approach. The latest research has demonstrated the importance of knowledge transfer in improving firm competitiveness in transition economies. For example, Hooley, Cox, Shipley and Fahy (1996) found evidence that the transfer and utilisation of western management skills accounted for a great improvement in the competitive advantages of foreign-invested local firms. This study demonstrates that FDI, as it does in the developed markets, also nurture the competence of the newly established affiliates in emerging markets.

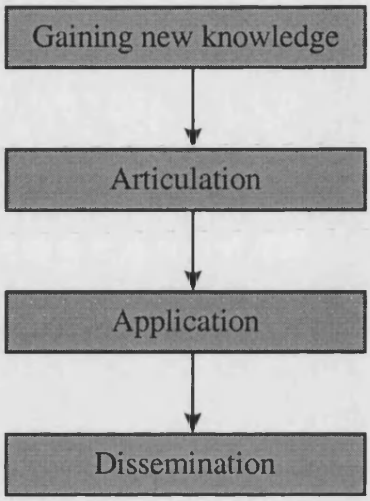
2.23 The process of knowledge transfer and organisational learning

According to Inkpen (1995b: 55), knowledge transfer and organisational learning involves two stages in a JV context. The first stage begins with the formation of the JV and partner interactions. The interactions and the managers' exposure to partner knowledge may lead to the recognition of partner skill differences embodied in the JV operation. Information acquired from outside the organisation can be used strategically only to the extent that it is distributed and interpreted within the organisation (Aguilar 1967; Jelinek 1979). Thus, the second learning stage involves the integration of information acquired by individual managers into the parent's collective knowledge base. The input for this stage is the recognition and interpretation of information associated with skill differences between the partners.

The two stages are analogous to the innovation diffusion process that also comprises the gathering and transmitting of information across organisational boundaries (e.g., Tushman 1977; Tushman and Scanlon 1981). Inkpen's two-stage model generalises the complicated process of knowledge transfer and organisational learning in such a way that it can only serve as a launch pad for examining the further details of this process. More 'connective tissues' are needed to enable the detailed exploration of the process of organisational learning that is outlined in the second stage of Inkpen's model. The other thing Inkpen failed to acknowledge is that the recognition of knowledge difference between the partners may take place prior to the setting up of a JV, and the JV is a vehicle to enable the transfer of knowledge from one party to the other(s), as the case of JV between GM and Toyota (Keller, 1989).

Hedlund and Nonaka (1993) also examined the process of knowledge transfer and organisational learning. They proposed a much more detailed process which could be expressed as: gaining new knowledge (knowledge transfer) --articulation -- application -- dissemination (*ibid.*, p. 126). This process can be illustrated as a sequence of steps as shown in Figure 2-1:

Figure 2-1: The steps in the utilisation of knowledge



Inkpen's two-stage model and Hedlund and Nonaka's four-step model provide a foundation for this research to create a framework of examining the issues relating to the complicated process of knowledge transfer and organisational learning within, and between, firms. As very limited research has been done in respect of the knowledge transfer process, this research will integrate the above process models of Inkpen (1995b) and Hedlund and Nonaka (1993) into our analysis on the knowledge transfer and organisational learning process in the cases chosen in the Chinese market. Following the leads given by the two models above, the following literature review intends to address the following questions: What type of knowledge has been transferred from MNC's parent to affiliate? How has knowledge been transferred? How has the transferred knowledge been assimilated based on a deliberate organisational learning process within the recipients?

2.3 Knowledge transferred by FDI

The shift in the balance of research from the economics-based approach to the managerial approach, and from technology to knowledge, has taken place largely since the late 1970s. This has accompanied a methodological change, from focusing solely on the transfer of MNCs' resources across national borders, to taking a holistic view of the impact on the firm's competitive advantage, and of the firm's strategy. The most recent studies show that multinationals entering new markets are seeking to exploit their competitive advantages by transferring knowledge to the subsidiary in order to build its capabilities (e.g., Chang and Rosenzweig, 1995:18; Kogut and Zander, 1993: 636).

2. 31 The classic motives for FDI

John Dunning (1993:56) identifies four generic categories of motive for FDI: natural resource seeking, market seeking, efficiency seeking and strategic asset or capability seeking. Different motives have different implications on knowledge transfer.

Natural resource seeking is strongly identified with backward international vertical integration in order to secure supplies of commodities. Vertical FDI and intra-firm trade are generated as opposed to non-affiliate trade in natural resource products. Typically the firms involved will originate from developed countries, and will own or have interests in extensive downstream production or selling activities, or both, that invest in less developed countries (Buckley and Clegg, 1991). A broad view of

this motive allows it to encompass the securing of the services of "cheap and well motivated unskilled or semi-skilled labour" (Dunning, 1993: 57). Technically[15], free labour cannot be internalised, however the location-specific nature of manpower prompts FDI to secure favourable access to labour services.

The implications of this motive for knowledge transfer are that mainly routine production technology would be transferred. While it might prove efficient to transfer some basic management skills, management and financial arrangements are more likely to be conducted by expatriates (who would return to the home country). Other things being equal, there would be little incentive to transfer neither marketing, nor purchasing and supply knowledge, as these functions will be centralised within the parent multinational.

Market seeking is the classic designation for most horizontally integrated manufacturing FDI by MNCs originating in developed countries that invest in other developed markets. It is encapsulated by the research of Dunning (1958) and Hymer (1960; 1976), which centred on US FDI in the UK and in Europe. Industry-specific barriers, again in the form of market imperfections, exist to the transfer of firm-specific assets. This results in MNCs engaging in a production process that is vertically integrated internationally, with the home country specialising in the creation of firm-specific assets (e.g., via research and development), which are then transferred to the foreign affiliate. This is typically described as horizontal FDI, as the affiliate is a replica of the production unit in the home country. The transfer of

[15] That is to say legally. The internalisation of labour markets would amount to slavery.

the firm-specific assets normally confers a degree of monopoly power of the foreign affiliate.

Efficiency seeking FDI emerges because of the existence of industry-specific barriers to the contractual co-ordination of production between countries. Casson (1991) has argued that these barriers are associated with asymmetric information over quality in intermediate product and services trade. This motive encompasses a family of categories of international vertical integration strategies, whereby FDI is generated as opposed to, for example, subcontracting or management contracts. These seek to attain optimal scale in vertically separable stages in the production process, exploit the mutual dependence of sales between different markets, minimise of transport and spatial information costs, and the benefits of economies of scope at the firm level. The outcome of these pressures has been the reorganisation and rationalisation of existing patterns of FDI based on a country-by-country basis, towards cross-border product or process specialisation, or both (Dunning, 1993:59). Information flows to co-ordinate production are clearly important between all stages. There are gains to the firm from the internal transfer of learning experiences that result from producing in different cultures with varying consumer tastes and cultural attributes. Knowledge about how to market and how to employ within different cultural groups can be crucial for the multinational firm, as the world is populated by various geographically dispersed, but to some extent similar, cultural groups.

Strategic asset or capability seeking motive helps to explain the often-perplexing cases in international business where a firm with an inferior ownership advantage in

a key field acquires a firm with a superior advantage. This 'reverse' FDI can be explained by this motive, and is usually fuelled by the investing firm's ownership of advantages in capital raising. Where a knowledge-based strategic asset is acquired, it should be expected that knowledge would flow from the location of the acquired asset. In this respect, the acquired knowledge asset would contribute to the MNC much in the same way as an absolute advantage under market seeking FDI.

The motives for FDI therefore do contribute fundamentally to the incentive for knowledge transfer to the affiliate. However, the position of any particular country depends on the balance of motives across the different sectors.

2.32 The characteristics of the transferred knowledge in the context of FDI

From the earlier review of the various knowledge items, it is evident that the resources transferred may typically include financial resources as well as knowledge-intensive resources, such as patents and formulas, proprietary processes or proprietary equipment, and managerial practices. Teece (1981) emphasises that knowledge transfer is typically a package, including the tangible embodiment of the technology and the associated tacit managerial know-how, which cannot be separated if the transfer is to be successful. Kogut and Zander (1993: 626) go further, to argue that the essence of FDI is the transfer of the organisational principles, or knowledge, of the firm from one country to another. There is therefore, especially in the more recent management writings, a consensus on the importance, indeed the

pre-eminence, of soft technologies. This is in marked contrast with the emphasis in the economics-based development literature on hard technologies.

The business literature generally refers to at least three types of technology: product, process and management. Management technology is the knowledge used in operating a business — the managerial skills that enable a firm to compete by using its resources effectively (Groose, 1996: 782). It is true that most of the academic literature on the costs and benefits of technology transferred by MNCs to host countries has been concerned with the hard technologies of products and production processes. From this one might assume that hard technology was the most crucial type, certainly in the manufacturing industries. However, Behrman and Wallender (1976) and Robinson (1988) consider the full range of technologies that may be transferred within manufacturing industries, and found that 'soft' technology was the key transfer, and that it was highly firm specific in nature. This supports the view that the willingness and ability of firms to transfer and adapt soft technology and, in particular, organisational structures and work practices (UNCTC, 1990), is of leading importance in international business.

In the service sector, much of which employs relatively "soft" technologies intensively (Enderwick, 1989) compared with manufacturing, management-related and organisational technologies are, understandably, overwhelmingly important. According to Groose (1996: 782) the key technologies in the service sector include: knowledge of experience in the business; the methodology for producing the service; management skills; technical and specialised information; financial skills. This

broader definition of "technology" is also supported by Lan and Young (1996: 58) who similarly list technical knowledge, but also organisational know-how in such fields as finance, marketing and management skills. Marton's (1986) discussion of the transfer of industrial technology by transnational firms to less developed countries (LDCs) likewise emphasises the 'soft' nature of the technology, *viz.*, knowledge, skills techniques, and experience.

The ability to transfer technology and management processes may depend on the existence of social knowledge. This type of knowledge is not itself directly productive and, unlike technology, does not flow only (or primarily) from the parent to the affiliate. This type of knowledge is critical for the parent company to understand, but not necessarily share, the value or behavioural systems of the affiliate in order to harness the affiliate's non-bureaucratic and social control system.

In the theory of international business, social knowledge[16] influences the ability to transfer technology, through reducing the transaction costs[17], and, hence, direct investment flows (Buckley and Casson, 1976). Social knowledge is defined as one's ability to understand and predict others' general patterns of behaviour (Tolbert: 1988). It follows that culture issues, as the core of social knowledge, also have a role in the transferral of other types of knowledge. According to Hofstede (1980), culture, in a broad sense, refers to the social context within which humans live. Culture may be regarded as the set of attitudes and values that are common to a group of people,

[16] Going under the name 'region-specific factors' in Buckley and Casson (1976).
[17] Buckley and Casson (1976) hypothesise that the higher is social knowledge between one country and another, then the lower will be international transaction costs. Therefore the volume of FDI will be higher. They also argue that social knowledge will, *ceteris paribus*, favour external markets over internal.

and that affects the ways that individuals perceive and respond to their environment. It is a kind of collective "programming of the mind that distinguishes the members of one human group from another" (Hofstede, 1980: 13).

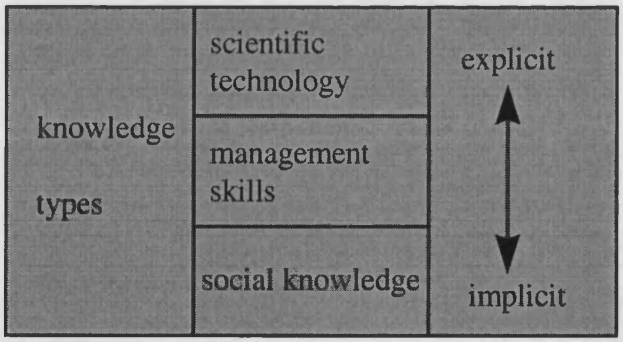
Knowledge may be considered as a mixture of both articulated (or explicit) knowledge and unarticulated (or tacit) knowledge (Nonaka and Takeuchi, 1995). Articulated knowledge is specified either verbally or in writing, e.g., verbal instructions, training manuals or computer programmes. It is therefore systematic and transferable from wherever it is located in such forms as databases, manuals or procedures (Hedlund and Nonaka, 1993). In contrast, tacit knowledge is intrusive, non-verbalised and unarticulated (Polanyi, 1969; Hedlund and Nonaka, 1993; Howells, 1996). It is not formalised, since it depends on individual and collective experience, and is rooted in habits and value systems (Quelin, 1998). As a result, tacit knowledge is hard to communicate and share (Howells, 1996).

However, tacit and explicit knowledge is thought of as equally important (Polanyi, 1966), and they both contribute to the development of MNCs. Tacit knowledge within organisations is commonly tied to the usage or activation of explicit, or codified, knowledge. Accordingly, Quelin (1998) argues that it is important to organise personal contact together with the exchanges of information and technology, e.g., through co-operative activities. With its reliance on personal contact, tacit knowledge will tend to raise the transfer cost of knowledge. However, it does offer the opportunity to mitigate the main drawback of articulated knowledge, that it is more vulnerable to imitation by competitors.

It can be argued that all knowledge items are a compound of explicit and implicit knowledge, with the balance between implicit and explicit varying on a sliding scale for each item. It is evident that scientific technology is more explicit than social knowledge, which is the product of cultural, historical and psychological factors by their nature resistant to articulation verbally or in writing. However, much international management training, and many manuals and guidebooks, represent attempts to codify social knowledge in other countries for a business community forever more exposed to the need for this knowledge.

According to the extent of articulation, knowledge can be divided into two categories: explicit knowledge and implicit (tacit) knowledge, as represented in Table 2-1.

Table 2-1: The categories of knowledge



Foreign parents can be a vital source of both tacit and explicit knowledge for international joint ventures (IJVs) in host markets. The knowledge transferred from the foreign parent can be grafted into its affiliates via socialisation and training, in conjunction with the transfer of the different types of explicit knowledge to create

new knowledge that is appropriate to the affiliate (Nonaka, 1994; Nonaka and Takeuchi, 1995; Lyles and Salk, 1996: 879). It was found that transfers of technical know-how occur relatively rapidly at the outset of the IJV, but it took longer for the Hungarian IJV managers and employees to absorb and adapt to the administrative and managerial skills of their Western parents (Lyles and Salk, 1996: 880). To fulfil the transfer of these managerial skills, local managers are required to actively participate in their exposure to ideas, concepts and processes over time (Nonaka, 1994). This active participation is associated with firms that have parents with equal, or nearly equal, equity participation (Killing, 1983; Salk, 1992). It is worth noting that, in the longer term, the sharing of a common national culture may be less important than the tacit knowledge shared in a strong corporate culture. However, national differences may strengthen the variety of experience of markets and resource inputs that are necessary for knowledge creation.

From the above overview of the literature, it can be said that the transferred knowledge is a compound of explicit and implicit knowledge and the types of transferred knowledge are composed of technology, management skill and social knowledge.

2.33 The characteristics of knowledge transferred at different stages

There are three broad factors determining the nature and medium of knowledge transferred at each stage. First is the stock response effect to the existing knowledge gap. The skills currently available within the affiliate will determine what types of

knowledge need to be transferred at different stages and the degree of exigency in making the transfers. The second concerns the motives for the acquisition of the affiliate[18], and the third relates to the predicted requirements of the affiliate as the host environment develops.

There will be an optimal rate of transfer, governed by the resources of the parent and the learning ability of the affiliate. For example, financial knowledge which would be immediately beneficial may be transferred via expatriate movements in order to speed up the transfer, while marketing knowledge not instantly required in an as yet unsophisticated host market, could be transferred via training over a longer period. It follows that the evolution of the affiliate should be considered in different stages (Chang and Rosenzweig, 1995). Different types of knowledge will be transferred during the various stages of an affiliate's development, and the means employed will reflect the urgency of the transfer.

Initially, it is usual for key technologies and some management skills to be transferred from the parent to the affiliate. This is typically followed by the transfer of social knowledge which is critical in ensuring that the new affiliate achieves and maintains a competitive advantage by fully utilising the transferred knowledge as well as creating new knowledge incrementally.

In the case where the affiliate must compete internationally rather that just within its domestic market, the development of a global competitive capacity within a broader

[18] The effects of the motives for FDI were reviewed earlier.

perspective must replace narrow parochial attitudes (Bartlett and Ghoshal, 1986). Eventually, the formation of dynamic corporate culture based on trust and understanding should arise from social knowledge transfer. This equates with a reduction in socially generated transaction costs (Buckley and Casson, 1976), and a consequent rise in the volume intermediate flows. General support for this "different stage-different transfer" model has emerged, e.g., the Sony Corporation's development in the USA (Chang and Rosenzweig, 1995: 14-15).

2.4 The way of transferring knowledge by FDI

As Contractor and Lorange (1988: 81) point out: despite the rich collection of studies on technology transfer, key issues remain unresolved regarding the nature of technology itself, on the one hand, and the transfer process, on the other. Since technology is usually regarded as the main constituent of knowledge, and there is already a pool of research on the process of technology transfer, we will examine the issues in relation to knowledge transfer in this chapter based on previous studies on both knowledge as well as technology transfer. In attempting to explain the way of knowledge transfer, three issues stand out as the basic elements: the choice of transfer mode; the execution of knowledge transfer; and the cost of knowledge transfer. There are other stumbling blocks to the way of knowledge transfer. First is conflict and disagreement over the objectives, for instance, in research and development. Secondly, working methods may differ because of organisational structure or because of cultural distance between the partners. There is the risk of a dilution of property rights and dissipation of the value of proprietary knowledge

through imitation. Lastly, there is the problem of controlling the organisational processes for assimilating the knowledge developed during the co-operation utilisation (Quelin, 1998). These issues will not be discussed in detail, however. Instead, this section will focus on the three key issues mentioned above on the way of knowledge transfer.

2.41 The choice of transfer mode

There are three generic international transfer modes available for the international transfer of technology[19]: non-affiliate contract (e.g., licensing), equity joint venture[20] and whole ownership (Kogut and Zander, 1993: 632; Dunning, 1993: 311; Groose, 1996: 782). The last two modes are equity-based modalities, and necessarily imply the existence of multinational operations. The theoretical determinants of this choice are the subject of a now vast literature, dating from Buckley and Casson (1976) and Dunning (1977). They can generally be described as contributing to the internalisation theory of the MNC or the eclectic paradigm (Dunning, 1993).

Theoretical contributions continue to be made, however, the centre of gravity of the literature has shifted now to empirical testing, of which studies by Davidson and McFetridge (1984; 1985) are early examples. This study of US firms finds that the

[19] In the past, exports of technology-intensive products were sometimes regarded as a form of technology transfer. However, this has fallen out of usage, and is also of little relevance to this study.
[20] As indicated earlier, joint ventures between a parent from a developed country and a parent from a host developing economy should be distinguished from joint ventures between two developed country parents in a host developing country (Beamish, 1985; Beamish and Banks, 1987). The evidence suggests that the first type of IJV is inherently less long-lived and stable. Evaluating the performance of the IJV is a separate, and highly controversial issue (Boersma and Ghauri, 1999). The precise composition of joint ventures by type may affect knowledge transfer. However, too little research is available on this to draw any firm conclusions.

transaction costs of using external markets, together with the experience of firms, were the most powerful explanatory factors of the modality of international transfers. In particular, the age of the technology, the number of prior transfers of technology, and the transferor's R&D intensity were all strongly and positively related to the propensity to internalise technology markets. No clear relationship was found between mode chosen and market size, the technological sophistication of the receiving country and the profitability of internal markets, while government policy appeared to play a modest role in influencing the form of technology transfer. Earlier theoretical work by Magee (1977) suggested that as firm-specific technology matured and lost some of its uniqueness, the profitability of internal over the external modes evaporated. Accordingly, firms would consider switching the modality of transfer from FDI to licensing. It is clear that in any empirical study, the age structure of firms, their experience, the products and the industry, can materially influence the findings.

One generally robust finding for MNCs in developing countries is exemplified by the early study of Contractor (1980). This research argued that the market for technology between developed and developing countries is likely to be more imperfect than that among developed countries. This can be attributed to inadequate technological supply capabilities, back-up services, or an inability to absorb new technologies. The larger the gap between transferor and transferee, the more likely foreign firms are to prefer to internalise technology transfers rather than engage in licensing. These are augmented by host country factors that affect the transfer mode,

such as geography, language and religious proximity, and literacy, each of which are identified in the theoretical literature (e.g., Dunning, 1993).

Kogut and Zander (1993: 637) also found that knowledge that was more tacit, in terms of codifiability and teachability, was more likely to be transferred across national boundaries to a wholly-owned subsidiary than through either of the other two modes. In a later paper (Zander and Kogut, 1995), they showed that the time taken to transfer a technology was positively related to the tacitness of the technology. Other findings were that more rapid transfer is associated with parallel development by competitors. Also, the speed of imitation is enhanced by spillovers of enabling technology to others in the industry, and retarded by the innovating firm's continuous improvement efforts. The implications of this are that the more competitive the environment, the more rapid will be transfer, and the greater the incentive to intensify the use of tacit knowledge, to improve the appropriability of firm-specific advantages. This very much agrees with our conclusions based on the effect of the degree of final market power of the firm, but with the additional conclusion that the intensity of tacit knowledge rises with competition.

Of the three modes of knowledge transfer, Kogut and Zander (1993: 639) argue that wholly-owned internal transfer is the most beneficial to a firm's long-term development. Internal knowledge transfers preserve and strengthen the firm's knowledge base, provide experience of environmental variety, and promote recombination of the elements of knowledge to meet new conditions. The firm's penetration of foreign markets is a race to exploit its firm-specific knowledge before

it is imitated by a competitor. Tacit knowledge is more difficult for competitors to observe and imitate and if a firm learns to transfer knowledge efficiently internally, it may be able to preserve more effectively an advantage. Bearing in mind Nonaka and Takeuchi's (1995: 80) argument that knowledge creation is a spiral of interactions between tacit and explicit forms, the implication is that there is an optimal combination of tacit and explicit knowledge. The firm should ensure that its transferred knowledge is in the form of a lock and key. The explicit information (the lock) should be of limited intelligibility to competitors without the tacit knowledge (the key). Although some leakage of knowledge in explicit form to competitors is likely, the absence of essential tacit knowledge should curb its value to them.

The above discussion, with the support of research by Wathne, Roos and Krogh (1996), allows us to make the following conclusions. The factors associated with increased equity-based control include: the tacitness of the knowledge; the firm's experience of prior transfers; the closeness of the knowledge to the transferor's main business; the importance of a channel for interaction between transferor and transferee; the R&D intensity of the transferor, and the prior existence of an affiliate in the recipient country. Factors favouring decreased equity-based control include: the age of the knowledge; openness, and trust. Host country factors thought to be important for the choice of transfer mode, decreasing the incentive for equity-based control, were literacy, geographic, linguistic and religious proximity, and the certainty of protection of intellectual property.

2.42 The execution of knowledge transfer

The literature suggests that the past strongly influences the way knowledge transfer is carried out. Knowledge transfer can arise from the direct experience of the organisation and of its members (Filo and Lyles, 1985; Huber, 1991; Lyles, 1988, 1994). Thus, "history provides an important starting point for knowledge development" (von Krogh, Roos, and Slocum, 1994: 60), a view to which Lyles and Salk (1996: 879) also subscribe. Organisations and their members also acquire knowledge from elsewhere, through the "grafting" of individuals with special expertise. This applies to the use of expatriates in IJVs and of "vicarious learning" from other organisations (Huber, 1991; Westney, 1988).

Learning through the grafting of cognitive orientations into managerial and technical functions is closely allied to Nonaka and Takeuchi's (1995) notions of knowledge transfer through socialisation and internalisation. Socialisation can involve conscious or unconscious acquisition of culturally embedded knowledge via exposure to reference individuals, groups and organisations. In the case of knowledge transfer to the affiliate, the referents would be from the foreign parent. Internalisation is achieved by the developing of experience over time in conjunction with explicit knowledge from the parent. Eventually the knowledge created becomes part of the orientation and routines of the affiliate itself.

The grafting of individuals is a more important method of knowledge transfer in the service sector compared with manufacturing. This is linked to a general difference

between the sectors. The technology viewed as fundamental in services is almost always not protected by patents or copyrights, but rather by secrecy. This contrasts with the routine patenting of technology and products in manufacturing industries. The key technologies in services tend to be human capital skills that are not capable of being protected by legal means, at least at reasonable cost. Service firms therefore resort to protecting the appropriability of their intangible assets through finding ways of retaining employees longer within the firm (Groose, 1996: 782).

In manufacturing sector FDI, Hedlund and Nonaka (1993: 132) see knowledge transfer as being executed in four ways: (1) selling products and services; (2) personal mobility; (3) licensing and gaining patents; (4) selling educational services (i.e., training). Groose (1996: 782) put forward a more specific itemised list of the means of knowledge transfer within the MNC: hardware (machinery); software; people transfer; people training; documentation; communication and legal agreements (permission).

When knowledge is explicit and codifiable, documents and manuals can effectively achieve transfer (Kogut and Zander, 1993: 631). However, when knowledge is complex and difficult to codify MNCs often send expatriates to perform key functions and to train local employees, or send local employees to the MNC parent for training (Chang and Rosenzweig, 1995: 18). The effective transfer of resources may be impeded by the choice of inappropriate means, such as a reliance on documents and manuals when side-by-side training is required. Transfer may also

fall short of objectives if the firm devotes insufficient resources, for example, in the form of expatriates (Chang and Rosenzweig, 1995: 18).

The next question is over the volume of knowledge transfer. The volume of knowledge of each type that is transferred should logically depend on the knowledge gap between parents and affiliate. This proposition is to a large extent in line with the argument by Gupta and Govindarajan (1991:771). They found that it was generally true that the extent of knowledge flows was greater to subsidiaries located in less developed countries than to those in more developed markets.

The extent of knowledge transfer also depends on the competitive strategy of the parent firm in the host market. The knowledge transfer volume directly affects the quantity of time, financial resources and human resources that the participating firms will need to invest. Among the limited research on this subject, Groose (1996: 793) suggests that the amount of technology transferred is influenced by: ownership, experience, internationality, joint and country. Lyles and Salk (1996: 881), on the other hand, argue that the factors thought to affect the level of knowledge acquisition by an IJV from its foreign parents include: the capacity to learn; articulated goals and strategies; and the degree of active involvement of the foreign parents in the IJV.

The literature provides little guidance on how to measure the volume of transferred knowledge. According to Groose (1996: 792), one method is to count the number of training days per year for officers and staff, the number of expatriates employed, and the number of visits by headquarters experts per year. Another approach would be to

gauge the technological royalties and fees for technical services paid by the affiliate to the parent. This measure is meaningful in manufacturing industries, where technology often is embodied in machines or patented processes, and requires clearly identifiable specialist services to effect the transfer. Management and franchising fees would be a counterpart for many service industries. In the light of the discussion in this chapter, if there is an unavoidable need to quantify knowledge transfer, it is clear that a composite approach should be taken. However, it is clear from the theory of international business that the financial values assigned to knowledge transfers can be heavily distorted by the transfer-pricing regime of the multinational (Hill, 1999). Physical values may be more objective, but introduce the problem of comparability across categories. The wisest course of action is almost certainly to encourage interviewees to qualitatively indicate the most important forms of transfer, and to compare the patterns of responses within, and between, firms.

2.43 The cost of knowledge transfer

The literature on the cost of knowledge transfer has come a long way since Hymer (1960; 1976) referred to the transference of the firm's advantage abroad via FDI at "a marginal cost close to zero" (Hymer, *ibid.*, p. 219). Contemporary writers refer to knowledge transfer as a costly and complicated transformation process (Hedlund and Nonaka, 1993: 126). There is evidence that tacitness increases the costs of transfer, while decreasing the speed with which knowledge is transferred within the firm and between partners (Kogut and Zander, 1993: 637). This is likely to be a result of tacit transfer being intensive in the movement of persons, which is a high-cost route, and

one that must depend on the availability of key individuals. To a certain extent, firms are able to mitigate these costs (Contractor and Lorange, 1988: 92-93).

Each medium of transfer will have their own functional form, with both static and dynamic scale economies (Arrow, *et al*, 1961), and perhaps diseconomies[21]. Lan and Young (1996: 60) suggest that costs include not only direct costs such as royalty payments, but also a range of indirect costs. Among the latter are communication and training costs, derived from resistance to foreign technology, lower levels of entrepreneurship, education or absorptive capacities. Many of these cost factors are clearly external to the firm. For example, those associated with host infrastructure, including scientific institutions and research and development facilities as well as vocational, technical and management training institutes and technology policy.

In addition to factors affecting communication and training cost, Teece (1977) found that the principal determinants of transfer costs are the degree of previous experience in transferring technology, the age of the relevant technology, and the number of firms using similar technologies. This demonstrates the importance of both internal and external effects on costs. The existence of other firms employing technology may provide both an indirect demonstration effect, and an effect through the availability of a pool of experienced professional and skilled manpower for the affiliates to recruit. This last point amounts to, in effect, a market for experience.

[21] The popular conception of the learning curve is an example of dynamic scale economies. This can be equated with experience, and linked to our discussion of how the firm might develop, or acquire, the necessary experience.

It is evident that the cost of transfer has multivariate causes, many with learning and external effects that are time-dependent. It follows that the successful execution of knowledge transfer depends both on a sound calculation of the costs as they stand, and on an understanding of how they are likely to change over the period of the transfer.

2.5 From knowledge transfer to organizational learning

In the case of the setting up of a new affiliate, knowledge transfer and organisational learning begin simultaneously. In young or new affiliates, or IJVs, knowledge structures are simple. From the outset the parent firm is responsible for transferring knowledge to develop the affiliate (Lyles and Schwenk, 1992). In the case of an acquired affiliate the process is different. Here the parent seeks to exploit the advantages of the affiliate — such as its resources or local market knowledge — while at the same time transferring its own firm specific advantages to the affiliate. Therefore the knowledge transfer is not a one-way street, as characterised in the product life cycle model (Vernon, 1966) and the Industrial Organisation Approach (Caves, 1996), as well as the early incarnations of the Internationalisation Theory of the MNE (Johanson and Vahlne, 1977). It can happen in both directions, i.e., from parent to affiliate and from affiliate to parent. Likewise, organisational learning takes place in both parent and affiliate following knowledge transfer. The effectiveness of organisational learning can make a huge difference in the competitiveness of the recipients (Inkpen, 1995b: 127).

2.51 The utilisation of the transferred knowledge: An organisational learning perspective

If the knowledge transfer process can be viewed as the transfer of new resources to the affiliate, then the success of the firm's strategy finally depends on the effective utilisation of these resources by the recipient. The conclusion of knowledge transfer by the process of utilisation pushes the analysis into the realm of organisational learning (Inkpen, 1995a and 1995b).

Many managers, management writers, and theorists maintain that organisational learning is the only sustainable source of global competitive advantage (Edmondson and Moingeon, 1998). For instance, where technical success (comprising product quality and excellence, productivity, and consistency) is the prime determinant of global market competitiveness, the capacity for organisational learning is an essential adjunct to maintaining competitive advantage. The literature on international strategic management and international joint ventures declares that organisational learning, embracing knowledge utilisation and adaptation, is an important rationale for the creation of IJVs that contributes significantly to IJV performance (Hamel, 1991; Hamel, Doz and Prahalad, 1989; Kogut and Zander, 1992; Lyles and Baird, 1994; Lyles and Schwenk, 1992). Learning is also held to contribute to organisational performance more generally (Filo and Lyles, 1985; Huber, 1991; Kogut and Zander, 1992; Nonaka, 1994; Lyles and Salk, 1996).

The cultivation of firm skills through learning involves the interpretation of past experiences and strategic choices as a basis for present and future actions (Porter, 1990). In the context of knowledge transfer, it is evident that these experiences and choices can be generated within the recipient firm, donated by the parent or secured through external recruitment. Nonaka and Takeuchi (1995) believe that organisational learning is most closely related to internalisation, which in the context of IJVs means taking explicit knowledge from the parent and converting it into tacit knowledge. It is closely related to "learning by doing"(*ibid.*, p.69). However, Lyles and Salk (1996: 879) subscribe to a broader view, that organisational learning connotes underlying organisational characteristics and structural mechanisms. These would be important for socialisation, i.e., converting tacit knowledge from the parent into tacit IJV knowledge, and for combination modes that combine tacit with explicit knowledge. Nonaka and Takeuchi clearly related these characteristics and mechanisms to training and educational programmes by firms. It would appear that the difference between the two views is over the degree to which organisational learning can be regarded as embedded in the firm. Either way, the knowledge generated through learning supports a firm's ability to understand the consequences of past actions and to respond to environmental stimuli. Therefore, effective learning results in the enhancement of an organisation's skills and capabilities (Cohen and Levinthal, 1990).

A central concept in relation to organisational learning is that of absorptive capacity. This is defined as the firm's ability to acquire, evaluate, assimilate, integrate, diffuse, deploy and exploit knowledge (Cohen and Levinthal, 1990). This definition

emphasises the readiness of the recipient unit to recognise the value of a practice, to assimilate it, and to apply it to commercial ends. There is a consensus that the absence of an appropriate skills base and absorptive capacity in an affiliate represents a severe barrier to knowledge transfer (Li and Shenkar, 1996: 54; Quelin, 1998). Therefore, transfer of a foreign firm's technology, management and marketing skills will be less successful if the local firms do not have the necessary skills base or absorptive capability. As Dunning (1993: 289) appositely observes, there is often a lack of complementary assets, particularly in the administrative and organisational capabilities, in some countries. This impairs the ability of affiliates to assimilate foreign technology efficiently, and is often as important an obstacle to economic development as the failure of these countries to acquire or obtain the technology in the first place. As far as the individual firm is concerned, it is best advised by the injunction of Cohen and Levinthal (1990: 129). To make the most of the transferred knowledge, the affiliate will need to commit substantial financial and human resources, invest in absorptive capacity directly, and carry out organisational changes in order to build up a positive environment to facilitate the knowledge utilisation.

One essential way in which organisational learning can be embedded is through the creation of teams. This is often thought to be important in both the transfer of knowledge and knowledge utilisation. The performance of multicultural teams within a single MNC was studied by Hedlund and Riddersaträle (1994). The authors developed a framework for understanding international research and development project teams, and provide illuminating detail on communication modes, the tasks of

team members, and the sources of difficulties. They find that individuals from the same culture are more likely to share tacit knowledge. This finding reinforces theoretical work on the importance of the social medium in learning and knowledge transfer. While the transfer of national culture would be problematic, the transfer of a strong corporate culture could in principle satisfy the need for a shared culture. Therefore, the transfer of social knowledge of the corporate variety is potentially invaluable. It might ensure the full utilisation of transferred knowledge and the incremental creation of new knowledge, enabling the affiliate to develop and maintain competitive advantage.

The furnishing of resources from the parent firm and resources secured locally enables the affiliate to begin operation. Once in operation, the subsidiary works with local suppliers, performs proprietary manufacturing processes, and markets its output to local customers. In short, it gains experience competing in the local market. The development of the affiliate's capability has been described as an evolutionary process (Chang and Rosenzweig, 1995: 4), based on the utilisation of the transferred knowledge and the development of new competencies in the local environment. Many factors are thought to affect the performance of the affiliate in the process of organisational learning. Among them, trust and relationship openness between the partners involved in the affiliate hold the key to the long-term success of the affiliate in the local environment (Inkpen, 1995b: 67). The result is an endogenous accumulation of capabilities, defined as skills, routines, and complementary assets, residing in the affiliate's employees and in its relationships

with external entities, specific to its line of business (Teece, Pisano, and Shuen, 1990; Kogut and Zander, 1993: 636).

The process of utilising the transferred knowledge by the affiliate is described as a knowledge transformation process. Knowledge transformation involves processes through which knowledge is added, restructured, recontextualised, reinterpreted, and through which new knowledge is generated (Hedlund and Nonaka, 1993: 123). It is basically an adaptive process in response to the needs of host markets. In a classic and far ranging study by Grant Reuber and his colleagues (Reuber *et al.*, 1973), the authors demonstrated that technology adaptation by affiliates in developing countries was more common in market-seeking than in resources-seeking or rationalised FDI. By far the most important stated reason for this high proclivity for adaptation was the idiosyncratic demands of the domestic market (Dunning, 1993: 294). It follows that the knowledge transfer, utilisation and transformation processes will tend to be more complete where the underlying motive for FDI is to service the domestic market. The more complete is this orientation towards the domestic market, the greater is the local responsiveness of the affiliate, and its current and future competitiveness.

2.52 The process of organisational learning

Learning is a dynamic process involving various organisational levels and actors (Inkpen and Corssan, 1995). Although much of the learning literature addresses the product or content of learning, of equal importance is the process of learning.

According to Hedlund and Nonaka (1993: 126), after receiving the transferred knowledge, organisational learning process is composed of three main stages: articulation, application and dissemination.

The first stage is articulation. The gaining of new knowledge represents the fulfilment of the transfer of knowledge resources. This is followed by articulation — the rendering of knowledge into explicit verbal or written form. For example, an organisation might make its corporate culture explicit by rules of conduct and ethical principles, thus transforming it from tacit knowledge to articulated knowledge. This is a crucial process, since it significantly increases the potential for critique, for testing, and most importantly, for sharing through the transfer of knowledge (Hedlund and Nonaka, 1993: 126). Articulation therefore lays a solid foundation for the utilisation of the transferred knowledge in the rest of the listed stages.

The next stage is application. Application refers to the process of making use of the articulated knowledge in the business operations of the recipient company. It is a process in which "knowledge at higher agency levels is accepted at lower ones" (*ibid.*, p. 128). During this process, adaptation, customisation and modification are normal phenomena employed to make the articulated knowledge realise its most potential.

Dissemination is the third stage. It can be defined as "when knowledge reaches the wider environment from the organisation" (*ibid.*, p. 131). The result is the output of the organisation, which can take the form of statements (such as patents), action

(starting manufacturing) or tangible products. In a way, firms are main instruments for the exploitation of knowledge originating elsewhere, and dissemination is the route for the recipients to further exploit the utilised knowledge in a wider environment. Indeed, dissemination indicates the further transfer of knowledge (both utilised and newly developed) to more parties. It is legitimate to assume that at this stage the knowledge is further transferred from the recipient to its own affiliates or firms related through business process (suppliers or potential cooperative partners). It can, however, be transferred from the recipient back to its parents which previously transferred knowledge out in the first place. This provides an opportunity for the parents to refresh their understanding of the practices of doing business in the environments where their affiliates are currently operating. Further discussion on knowledge transfer from an affiliate to its parent follows in the next section.

2.53 Knowledge transfer from the affiliate to the parent

It is a relatively short step from the discussion of learning in the affiliate to the topic of subsequent parental learning via feedback from the affiliate. This can be directly linked to the behavioural or stages approach to the internationalisation of the firm discussed earlier, and to the later management literature. The knowledge transfer literature preferentially takes the unit of analysis to be the headquarters and a single affiliate, whereas the international business literature takes the MNC group as the unit of analysis. Description and analysis of the process of learning accordingly becomes more complicated, and still more so the greater the complexity of the MNC.

Writers such as Chang and Rosenzweig (1995:23) foresee the affiliate's eventual development to the point where it will have newly developed knowledge and capabilities to transfer to the parent. In the JV context, learning and internalisation of JV-derived knowledge by a JV parent can be viewed from three perspectives. First, JV knowledge might be used in the design and management of other JVs and alliances (see Lyles, 1988). Second, parent firms may seek access to other firms' knowledge and skills but will not necessarily wish to internalise the knowledge in their own operations. As Hamel (1991) pointed out, knowledge that is embodied only in the specific outputs of the JV has no value outside the narrow terms of the collaborative agreement. Third, and the focus of this research, knowledge from a JV can be used by the parent company to enhance its own strategy and operations. The acquisition of this type of knowledge, called output knowledge by Westney (1988), has been suggested as one of GM's objective in its JV with Toyota (Keller, 1989). GM hoped to learn about the efficient production of small cars and transfer its knowledge to GM plants. The focus on knowledge useful to the parent is consistent with the identification of learning as a possible motive for the formation of JVs.

These improved knowledge resources may be transferred to the parent in the first instance, but they constitute new capabilities to be transferred within the MNC on a worldwide basis. This reverse knowledge transfer represents a return on the parent's initial knowledge transfer, but it also is the hallmark of the maturing of organisational learning. The structures and mechanisms that worked during the prior process of knowledge transfer and utilisation to the affiliate will generally be

effective in the opposite direction. Social corporate knowledge, and the myriad factors that amount to a "common language" will have been established. As with a natural language, it may serve first as a medium for instruction, but it is equally good as a medium for dialogue. The parent's absorption and application of knowledge from the affiliate via the reverse knowledge transfer can be carried out efficiently, in terms of less time, lower cost and higher utilisation, thanks to the prior experience of transfer. This argues for the existence of a characteristic sequence in the international organisational learning of the firm.

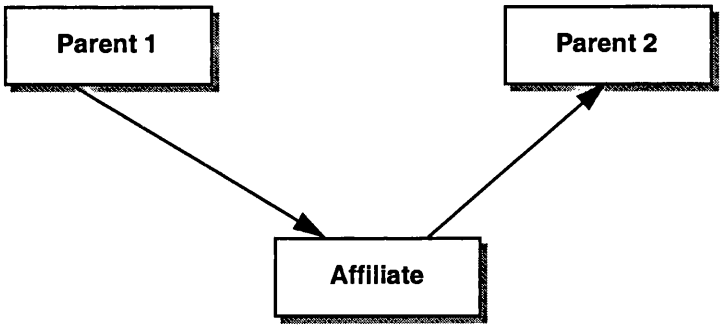
2.54 Extending the analysis

The purpose of this section is to elaborate in more detail the stylised facts of organisational learning in the specific context of an IJV. The earlier sections have provided an understanding of the knowledge transfer process between one parent and one affiliate. Here, the analysis is extended to consider knowledge transfer between two parents and one affiliate, and, as a result of this, knowledge transfer between two affiliates via the parent, i.e., in the specific case of international joint ventures.

The focus on knowledge useful to the parent is consistent with the identification of learning as a motive for the formation of IJVs (Inkpen, 1995a). Often, the parent firms bring complementary skills and knowledge to a joint venture, and this is an important consideration in selecting a joint venture partner (Glaister and Buckley,

1997)[22]. The process of partners learning from each other via knowledge transferred to and from the affiliate is summarised in Figure 2-2:

Figure 2-2: Learning between parent firms in an international joint venture

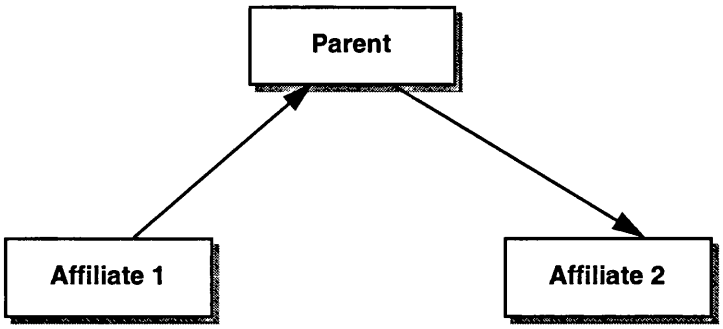


Parent 2 acquires knowledge from Parent 1 by gaining output knowledge from the joint venture

As the theoretical literature has demonstrated, output knowledge may also be a significant knowledge flow in the instance of one parent with two affiliates, shown in Figure 2-3. The parent company usually absorbs knowledge acquired from its first ventures abroad into its general internationalisation strategy, and is able to transfer relevant knowledge to newly acquired or established affiliates. This is compatible with the idea of organisational learning, and the transfer of learning across organisational subunits discussed by Bartlett and Ghoshal (1995). It is also congruent with the Nordic School of research, and the empirical approach adopted by Davidson and McFetridge (1984; 1985).

[22] The motives for the IJV clearly impinge on the issue of knowledge transfer. Here these are addressed preferentially from the perspective of the international management literature.

Figure 2-3: Learning between affiliate firms via the parent



Parent using output knowledge from one affiliate to improve competitiveness of another affiliate

The strategic decision by the partners to supply knowledge in a tacit form to the IJV may be intended to prevent dissipation through learning by the other partner, not simply to control dissipation by assimilation by firms unconnected with the IJV. However, as discussed earlier, partners may specifically wish to prevent the "bleedthrough" of knowledge assets to each other (Harrigan, 1985). In this case the knowledge concerned should properly be termed the "input knowledge" of each partner, rather than the output knowledge of the JV. Therefore, we would expect the design of management control to reflect the strategic concerns of the partners, which should be observable in the division of tasks (supply of knowledge assets) and the composition of tacit and explicit knowledge. In particular, we might well expect to observe an otherwise inexplicable separation of corporate cultures between the partners in the JV, in order to limit strategically the "bleedthrough" of input knowledge. The intensity of tacit knowledge will depend both on the degree of codifiability of the knowledge resource to be transferred, and on the strategic concerns of the transferor.

The literature on affiliates as generators of scientific knowledge (e.g., Papanastassiou and Pearce, 1997; 1998) is more applicable to affiliates in developed countries.

However, in the case of market entry via JV into the liberalising markets of the CEECs and China, it is quite possible for there to be elements of 'reverse-learning' by the parents (or at least one of the parents) from the affiliate. As we have argued, reverse learning is in fact implicit in the behavioural explanations of the internationalisation of the firm, and is best exemplified by the stages theory. This theory earlier emphasises the role of process and foreign market learning that can be re-used in other locations. The CEEC and Chinese markets lend themselves to this type of approach. They are all former centrally planned economies, but with liberalisation at different stages of advancement. This provides a clear incentive for the parent to gain knowledge from the affiliate on how to operate in such markets. This can be re-used in future market entry within the CEECs, China, or other liberalising markets.

The higher degrees of complexity in MNC organisational learning should be viewed as special cases of combinations of the 'building blocks' of analysis we present here. The simple one-parent one-affiliate (1:1) model, subsequent extension to two-parents one-affiliate (2:1) and one-parent two-affiliate (1:2) models can be viewed in terms of the building blocks of any MNC. In other words, knowledge transfer within a MNC may be understood more easily by considering the MNC as consisting of a number of 1:1, 2:1 and 1:2 relational subsets and considering knowledge transfer

within and between these subsets. We must, however, note that the analysis of IJVs with multiple partners is inherently fraught with difficulties compared with joint ventures with two investing partners (Geringer, 1991). The evidence is that IJVs with more than two partners are not readily tractable within the simplifying framework used here.

2.6 Technology and knowledge transfer to transitional economies

There has been, of course, a distinct literature on technology transfer to less developed countries (LDCs), very much related to the economics of development[23] (Casson and Pearce, 1987). The early literature on this subject has often couched the issue of transfer in terms of the problems that exist in transferring production techniques between countries with different factor proportions, e.g., the pioneering work of Eckaus (1955). Further studies focused on the efficiency effects of capital-labour substitutions in less developed countries (LDCs) in the context of an aggregate production function (Arrow, Chenery, Minhas, and Solow, 1961). All these studies focus on hard (scientific) technologies rather than the soft (organisational, managerial) know-how that underlies radical change through FDI. The later literature of the 1960s, through to the early 1980s, in the main, preferred to prescribe policies towards MNCs, technology transfer policy, and often gave sustenance to the infant industry argument as a useful tool of domestic and international trade industrial policy (Buckley and Clegg, 1991).

[23] This topic is reviewed in Buckley and Clegg (1991).

It became clear by the middle of the 1980s that increasing numbers of less developed countries were changing their attitudes towards foreign multinationals, from an essentially hostile (or at best cautious) stance, to one of encouragement towards FDI. This sea change was accompanied by a world shortage of loan capital and an accompanying shift in demand in favour of equity capital for development (Buckley and Clegg, 1991; Dunning, 1993). However, it remains the case that the majority of research on FDI and development has largely ignored the potential benefits of market liberalisation measures, which for many years were generally resisted by LDC governments. The largely economics-based literature is limited to the issue of scientific, especially production, technology. It generally fails to treat knowledge in the round, largely because the issue of knowledge transfer arises most forcefully when firms operate in competitive markets. It is under conditions of market liberalisation that far-reaching organisational change and knowledge transfusion is required.

Historically, there has been a tendency for economics-based academic research to work within the demands by less-developed countries for hard technology. Countries that have experienced excessive and prolonged government intervention, or state ownership and control whether under central planning or not, have imbibed a production orientation, philosophy, and human resource policies that emphasise production skills (Lan and Young, 1996: 80). This accounts for the customary preference for production technology at the expense of soft technologies. The most critical gap in skills therefore lies in the other corporate functions, such as sales, advertising and marketing, procurement, accounting and finance, and market-

oriented research and development. Each of these is essential not only for domestic competition following market liberalisation, but to compete in the world economy — a respect in which these economies have fallen behind. It is not surprising therefore, that, in effect, when export-oriented production occurs in a less developed country, it is the marketing and distribution skills of the MNC that are most crucial in securing foreign market share.

The bulk of the literature on knowledge transfer is focused on developed countries because most of these have long enjoyed competitive markets at home. However, the research issues for knowledge transfer to competitive developing markets, and to liberalising transition economy markets are distinct. The comparable levels of economic development between developed countries mean that the research is largely based on case studies of knowledge transfer within organisations. In the transition economies, research must grapple with knowledge transfer within a setting where institutional and cultural factors play an important role in deciding corporate performance. The existing literature therefore does not relate well to knowledge transfers to transition economies that are at a lower stage of development.

It can be argued that the experience of liberalisation in the CEECs and China suggests, *prima facie*, that the value of market liberalisation for realising economic growth — and the rapid transfer and deployment of technology and knowledge in general — outstrips the impact of other policy measures. Historically, this has been a failure of conventional development economics. It is reflected in the past reluctance (conscious or otherwise), on the part of researchers to recommend liberalisation

policies that were unacceptable to governments committed to central planning. The outcome is that the conventional literature is severely limited in relevance to knowledge transfer to the LDCs, and it is therefore not reviewed here in detail.

2.7 Summary

Apart from explaining the central role of knowledge within the paradigm of international business theory, this chapter has tried to examine the current literature on knowledge transfer and organisational learning by FDI, with an emphasis on its process dimension. In doing so, it intends to address three broad questions: What knowledge has been transferred from the parent to its affiliate within a MNC? How has the knowledge been transferred? How has the transferred knowledge been utilised based on an organisational learning process? The management literature on knowledge transfer and the international business literature have to some extent converged regarding the role of knowledge. Both literature has a majority of writers coming down in favour of the internalisation of knowledge, and of the importance of tacit (or non-codifiable) knowledge in protecting the firm's competitive advantages. Combining the two allows us to extend the depth of analysis in the case studies of firms in the Chinese telecommunications manufacturing and automotive industries. It remains the case that while much is known about the factors influencing knowledge transfer between the developed economies, less is known about the factors directly applicable to emerging markets. We can surmise, however, that a crucial difference lies in the degree of stability and clarity of interpretation affixing to host government policies towards FDI and intellectual property in the CEECs and

China. Higher equity knowledge transfer modes are accorded greater preference by firms as a way of protecting the knowledge transferred from exposure to uncertainties over the appropriability of firm-specific knowledge in these host markets.

It is evident that there is a need for research specifically on the issue of knowledge transfer to the emerging markets. This is important both for firms' ability to manage the transfer, and to inform host policy. It is important not to overlook the fact that while high transaction costs imposed by the host environment increase the preference of firms for higher equity modes of transfer, there is also a negative volume effect. For firms engaged in knowledge transfer, the optimal level of knowledge transferred will be reduced on account of the high transaction costs and the risks associated with emerging markets. Moreover, there will be an unknown population of firms that, in view of the lower expected returns to their firm-specific assets in the host market, elect not to transfer at all, i.e., do not become foreign investors in that host. This is in addition to another equally unseen number of firms that will have been discouraged from transferring technology via non-affiliate contractual means. Had intellectual property protected been more robust and certain, the contractual method would be the natural choice for many smaller and medium-sized firms that lack the capital and management to engage in FDI.

In conclusion, international business theorists have tended to concentrate on the technological and financial[24] benefits of FDI, largely due to the predominance of

[24] The financial benefits are conventionally portrayed as the transfer of financial capital, rather than as the skills with which to manage the financial operation of the affiliate.

economists in this management area. There exists a large gap in the international business literature concerning the organisational benefits of FDI, such as the transfer of technology, management skills[25] and cultural change. Undoubtedly, as the study of economic transition in eastern and central Europe and China matures, attention will eventually turn from an emphasis on broad policy issues and easily quantified economic aggregates towards matters concerning the dynamic and sustainable nature of improvements in corporate performance. In particular, it will have to encompass fully the issues of knowledge transfer and organisational learning, which is at the core of improving the corporate performance and lasting competitiveness of FDI in these emerging markets.

[25]These may be transferred via a formal management contract, but much of the organisational change via FDI is informal, and is the result of the exercise of effective control by the parent.

Chapter 3 The Business Environment in China

3.1 Introduction

In the western world, China has long been regarded as a different country politically, economically and culturally (Carver, 1996). After two decades of economic reform and opening to the international business, China is quickly emerging as one of the most important investment sites around the world. FDI has played an essential role in continuously promoting China's economic efficiency and, as a result, increasing its share in world markets based on the strengthening of China's industrial competitiveness. However, the features of the Chinese business environment, government policies towards FDI and the role of FDI in the Chinese economy remain far from clear. This chapter will shed light on these issues. It will first analyse the characteristics of the Chinese business environment, then introduce the policies of the Chinese government towards FDI in China, outline the important role played by FDI in the Chinese market. Lastly, some background information will be provided about the two chosen industries of this research: the telecommunications manufacturing industry and automotive industry of China. Moreover, special government incentives and restrictions that apply to them will be explored.

3.2 Features of the Chinese business environment

The 1990s have witnessed a mushrooming of business interest in investing in China, and, in its wake, academic interest (Beamish, 1993; Child, 1991; Daniels, Krug and Nigh, 1985; Davidson, 1987; Pearson, 1991; Pomfret, 1991). It is a widely recognised fact that foreign direct investment in China presents many challenges to western business practices (Child and Lu, 1996). First and foremost, key issues concern how to cope with the highly distinctive institutional and cultural characteristics of the host country (Selmer, 1999), because the Chinese market still remains different from those western markets politically, economically as well as culturally.

First, the uniqueness of Chinese socialist market economy. China has been in a process of building up "its socialist market economy with Chinese characteristics" (Fang, 1999: 82). This can be translated as the present constitutional setting (one party dictatorship with mainly state ownership), and a public law regime (that is not transparent) which will not change even though China's market-orientated reform has deepened since 1992. Other features include central planning, government intervention, government monopoly over certain strategic sectors such as railway, post and telecommunications which will persist. It will be impossible to discern any quick disappearance of the usual features of the Chinese business environment, such as a changeable economic policy, the important role of internal documentation in economic governance (Carver, 1996), and market protection as a usual measure employed by local government to support the development of the local economy.

These aforementioned peculiarities of the business environment of China have already created many obstacles to foreign investment. Yip (1995) argues that foreign retailers who want to enter the Chinese market have to pay particular attention to macro-environmental factors, as the market is in rapid transition and is regulated by constantly changing government policy. Seo (1993) reports that although the laws passed by Beijing often look good on paper, there is a wide gap between theory and practice in the application. China's relatively unfavourable investment climate stems from a number of factors, such as changeable political conditions, ambiguous rules and an inadequate legal framework, arbitrary charges in the interpretation of the law and bureaucratic red tape [26].

As a result of the deepening reform carried out more recently, some of the above reported problems have either been easing, or have been largely solved. Legislature readjustments in order to make the law more transparent to foreign investors (which is part of the efforts made by the Chinese government to meet the criteria of applying for the membership of World Trade Organisation) have been augmented by the break-through in the convertibility of the Chinese currency, the renminbi (translated as people's money) yuan in current account transactions. This latter provision has enabled international business to exchange foreign currency freely for trade, dividend and interest payments, as well as profit remittances, and payments for

[26] Foreign investors have been complaining about undesirable "fees", such as "safety fees" and "public health fees", applied to them without prior notice. These fees, collected by local governments, only serve to increase the burden on foreign investors. Wu Yi, the foreign trade minister, has announced that the government would rectify random charges imposed on foreign investors in the hope that this will attract more foreign investment. "We must bring things out in the open, and let foreigners know beforehand what to do and what not to do", Wu said. (*People's Daily* (Overseas Edition), 29th December 1997, page 1)

services such as travel, freight and insurance, ensuring that the operation of the firm is unfettered by restrictions on international transactions. However, the fundamentals of this regime have not changed, which still creates uncertainties to FDI.

Second, the under development of social infrastructure. As the largest developing country in the world, with more than two thirds of its population still unurbanised, China can offer very little to meet the needs of foreign investors in terms of social infrastructure. Although many improvements have been made since 1978, the lack of western- standard business facilities is still the biggest handicap in the whole country in general, and in the middle and the western part of China in particular. Guo and Akroyd (1996: 33) identify several categories of barriers in the process of a technology transfer from a UK firm to its Chinese partner. Apart from management perception barriers, it is difficulties in information, communication and infrastructure that pose a great threat to the success of international business in China. One British managing director, who had personally been successful in doing business in China, commented "You can hardly find any yellow pages in China" (*ibid.*, p. 34). In the case of infrastructure barriers, the difficulties in the sourcing of raw materials, personnel training, and the problems of operating and maintaining the transferred technology and so on, are among the list identified.

Third, the dominance of "guan xi" in business activities. Some researchers have seen culture as the centre ground in understanding the differences of operating in China. Child and Lu (1996: 4) identify five prominent elements of Chinese culture relating to individual behaviour and the most cited among them is close personal

connections, or *guan xi* in Chinese pronunciation. While the *guan xi* phenomenon may be found to some degree in almost all parts of the world, commentators seem to be unanimous in the view that it is much more important in the context of Chinese business than else where. Davies (1995: 155) argues *guan xi* seems to be the lifeblood of the Chinese business community, extending into politics and society. Without *guan xi* one simply cannot get anything done. On the other hand, with *guan xi* anything seems possible. Björkman (1996: 70) also reports, based on his investigation, that companies that had good *guan xi* with the 'right' people were seen to have a big advantage. Therefore, competitors from different parts of the world had developed friendships with Chinese employees in the central ministries in Beijing, with government officials at the provincial and local levels, and with persons within the buying organisation itself.

However, *guan xi* is not everything. It would be naive to think that good *guan xi* alone would guarantee the success of business venture in China. Björkman (1996: 70) finds in his interviews that in spite of the perceived importance of *guan xi*, the respondents stressed that, with a few exceptions (usually concerning orders in South China), suppliers who were not able to compete in terms of technical quality and price had scant chances of winning business deals in China. McGuinness, Campbell and Lenotiades (1991: 205) argue that efforts to gain higher preferences through developing an extremely close rapport based on personal attractiveness may pay off, providing the company's services are also good. A better strategy for western firms is to concentrate on doing the basic marketing job well, and to let relationships take care of themselves.

3.3 FDI in China: Government policy and historic development

3.31 An overview of Chinese government policies towards FDI

FDI in China is divided into three categories: wholly-owned subsidiaries, joint ventures and cooperation projects[27]. In a joint venture, the foreign partner is required to hold a minimum of 25 per cent of the shares in the enterprise; no such requirement is necessary for a cooperative project, which is set up and managed by an agreement signed by the foreign partner and the Chinese partner (Lan and Young, 1996: 61). A wholly-owned subsidiary is entirely owned by a foreign company, including those from Hong Kong, Macao and Taiwan.

As early as the end of 1970s, the Chinese government began to introduce a wide range of preferential policies for foreign investors, providing a competitive investment climate internationally. First, the Chinese government has set a fairly comprehensive legal framework for FDI in general, including: The Law on Chinese-

[27] Other forms of foreign involvement include foreign indirect investment in the Chinese stock market, foreign capital borrowing and licensing and franchising agreement. Foreign indirect investment has been allowed since the beginning of the 1990s. The Chinese government has strictly controlled foreign investment through this avenue by segregating the stock market into A market (exclusively for local investors) and B market (exclusively for foreign investors) for fear of surrendering local industries to foreign control and privatisation. The B market has poorly performed until now due to the heavy handed approach of the Chinese government. Foreign capital borrowing (public and private) may be loosely categorised as one form of foreign involvement. This was the main vehicle for China to seek foreign capital in the 1980s. Its importance dramatically declined in the 1990s as foreign direct investment took off. Similar to the above, the Chinese government kept a tight state control in foreign capital borrowing and earned a good reputation for returning foreign loans timely. Licensing and franchising agreement has been regarded as an important vehicle to tap the Chinese market by foreign investors. However, it practical application has met with serious difficulties arising from enactment and enforcement of intellectual property laws in China. (See Bosworth and Yang (2000) for details.)

Foreign Joint Ventures (1979), Income Tax Law on Joint Ventures (1980), Law on Foreign Wholly Owned Enterprises (1986), and Income Tax Law on Foreign-Funded Enterprises and Foreign Enterprises (1991), among others. At the same time, China has also promulgated regulations on profit repatriation, foreign exchange, labour management, and lease, property right, etc. (Kening, 1997: 17).

Second, a series of tax concessions have been given to foreign investors, such as income tax reduction (only pay 15 per cent, while normal corporation tax rate is 33 per cent for FIEs and 55 per cent for domestic enterprises, which was reduced to 33 per cent as well in 1993), fixed-time tax exemption or reduction (usually tax exemption for three years and half rate reduction for another three years, and more preferential to high-technology or export oriented firms) and tax refunds for re-investment of profits, and so on. These preferential treatments have undoubtedly played an essential role in attracting FDI in labour-intensive and technology-intensive industries to China, especially before the 1990s.

Third, both regional policy and industrial policy have been developed to encourage the inflow of foreign direct investment. In terms of regional policy, FDI was first directed to the four special economic zones (SEZs) and fourteen coastal opening cities. Starting from 1992, the whole interior of China has been granted the same status as that of coastal areas, thus opening the vast inland area to foreign investors. At the same time, China has gradually withdrawn the restrictions set on foreign investors in most industries. Some previously prohibited sectors, such as highway construction, power generation, harbour and airport infrastructure, and even

retailing, financial services and consulting, have all been partially or entirely opened to foreign investors. In particular, a comprehensive package of industrial policy on FDI developed by the Chinese government in 1995 provided the full list of industrial sectors that foreign investors are encouraged to enter. The combination of policies in these two respects has raised FDI in those areas that the Chinese government most wants.

These preferential policies were not produced in one step. Rather, they were put in place in the last two decades, reflecting the changing nature of the Chinese economy from a centrally planned one to the present socialist market economy. The development of China's policies towards FDI since 1979 can be divided into three stages:

(1) 1979-85, the emerging stage. China was then still a central command economy, regarding FDI as a way of stimulating economic development and introducing foreign technologies in the four designated special economic zones (SEZS, comprising Shenzhen, Zhuhai, Shantou and Xiamen) in the southern coastal areas. Owing to inexperience, China only managed to deliver a legal framework suitable for the introduction of FDI under the mode of joint venture. The main laws promulgated during this time were The Law on Chinese-Foreign Joint Ventures (1979) and Income Tax Law on Joint Ventures (1980). Setting up wholly-owned subsidiaries by MNCs was restricted, indicating the strong suspicion on the part of the Chinese government on foreign ownership and its potential impact. Detailed national policies towards FDI were out of the question

during this time, while local governments in the four SEZs were given the power to produce policies of their own to facilitate the development of FDI of various kinds, with an emphasis on joint ventures. The policies developed by these areas were introduced to other major cities on a select-and-trial basis.

(2) 1986-91, the developing stage. Having accumulated a great deal of experience in the previous stage, the Chinese government came to the realisation that FDI was conducive to the economic development of the whole nation, not only the four SEZs and some major cities. In addition, the wholly-owned subsidiary as an entry mode came to be regarded as central to the introduction of large scale FDI. As a result, quite a number of laws were promulgated, such as the Law on Foreign Wholly Owned Enterprises (1986), and Income Tax Law on Foreign-Funded Enterprises and Foreign Enterprises (1991), among others. At the same time, more detailed policies were produced regarding issues such as profit repatriation, foreign exchange, labour management, leasing, and property rights (Kening, 1997: 17). The intention was to manage FDI properly under a socialist legal system. The Chinese government extended the favourable policies formerly restricted to SEZs to nearly the entire coastal areas and major cities across China, with the opening up of Hainan Province and Shanghai's Pudong at the centre. FDI was welcome regardless of which entry mode was employed. Having recognised the essential role of technology in economic development and international competition, the Chinese government also set up a string of high-technology zones in cities with strong higher education establishments or research bases in order to attract MNCs with a substantial content of advanced technology.

(3) 1992-present, the maturing stage. China for the first time claimed to be working towards the establishment of a socialist market economy with Chinese characteristics. This initiated a sea change in its attitude towards FDI. Foreign direct investment was not seen as something that threatened the national economy, as was feared during the days of the former command economy, but a vehicle to achieve economic efficiency and international competitiveness based on the introduction of technology, management skills and international practices. Accordingly, the initial favourable policies adopted by China were scrutinised in the light of international practices. Various restrictive policies were partly withdrawn. Foreign invested enterprises, including wholly-owned subsidiaries of MNCs, were gradually offered national treatment, guaranteeing their access to local markets, financial resources and human resources. A distinctive feature of this stage of policy reform, however, was the production of selective industrial policies towards FDI. This indicated a switch from pursuing volume to quality. Having seen an influx of FDI unmatched in the world except by the USA, the Chinese government believed it was time to attract knowledge-intensive and capital-intensive investments, rather than an indiscriminate approach, in order to accelerate economic development. In June 1995, the Chinese government produced its first "Industrial advisory list for FDI in China", indicating clearly those industries in which entry was encouraged, allowed, as well as those to which restrictions and those to which prohibitions applied. The extension of favourable policies to the whole of China and the production of selective industrial policies signalled the determination of the Chinese government to

upgrade Chinese strategic industries (such as agriculture, telecommunications, energy, transport, automobile, electronics, and pharmaceutical industry, etc.) to be internationally competitive through introducing a wide range of technological resources.

The other point worth elaborating is that China has been encouraging the introduction of technology-intensive investments, as well as labour intensive investments, from the very beginning of its opening policy. This has been more obvious in both the telecommunications manufacturing industry and automotive industry on which this research is based. According to the theory of international trade, China, as a less developed country, should introduce less advanced technologies to gain the benefits of international trade based on its cheap labour. Otherwise, being unable to absorb employment, China will pay a high price in creating a dual industrial structure, i.e., small, but advanced, high-technology industries in parallel with large, but traditional, industries of low technology intensity. However, it can be argued that China is so big that it can afford to have a dual industrial structure, where traditional industries, especially those located in small cities and countryside, are ushered in to take up the massive labour force, while government encourages the expansion of high-technology industries as a way of establishing China's national strategic competitiveness. Absorbing employment via the utilising of foreign direct investment, has never been a priority.

Based on the preferential policies towards FDI, China has made great progresses in attracting inward foreign investment. From 1979 to 1995, the actual utilised foreign

capital in China amounted to 250 billion US dollars, of which 115 billion US dollars accounted for foreign loans, and 135 billion US dollars for direct foreign investment (Zhang, 1996). The years from 1996 to 1998 continued to witness the strong inflow of FDI, each surpassing US$42 billion, indicating considerable success on the part of the Chinese government in attracting foreign capital from the world market.

Table 3-1: FDI in China, 1979-98
(Unit: Million of US dollars)

Year	Utilised FDI
1979-83	1802
1984	1258
1985	1661
1986	1874
1987	2314
1988	3194
1989	3392
1990	3487
1991	4366
1992	11007
1993	27515
1994	33767
1995	37521
1996	42350
1997	44488
1998	45600

Source: *China Statistical Yearbook* 1997; *Financial Times and China Daily*, various issues.

From Table 3-1, we can see the inflow of foreign investment in China can be divided into three stages: the initial stage from 1980 to 1985, a continuously increasing stage from 1986 to 1991, and from 1992 to 1998, an accelerating stage.

The sustained inflow of FDI has enabled China to occupy first place in the league of developing countries since 1993, being second only to the USA globally. This emergence of China as an inward investment site totally changed the structure of international capital movements. China's share of inward FDI among both developing countries and the world as a whole, as showed in the table below, has been extremely high.

Table 3-2: Comparison of inward FDI in all countries, developing countries and China
(Unit: Billion of US dollars)

Recipient	1991	1992	1993	1994	1996	1997
All countries	158	170	208	226	350	400
Developing Countries	41	55	73	84	129	149
China	4	11	28	34	42	44.5
China as % of all	3	6	13	15	12	11.1
China as % of developing countries	10	20	38	40	32.6	30

Sources: UNCTAD: *World Investment Report* 1998.

China's success in attracting FDI is evidenced in the steep increase in total volume, and partly derives from the fact that more and more large MNCs have invested in China's coastal area, which is a sign of the upgrading of the quality of FDI. By 1994, 52 of top 500 American companies by sales, 15 of top 20 Japanese companies, and 10 of top 15 German companies have invested in China (Ji, 1995). Shanghai, as the largest city in China, has alone attracted 36 of the world's 100 largest MNCs (People's Daily-overseas edition, 9th October 1995). Investments made by large MNCs have enhanced the technological level of FDI by transferring into China advanced technologies tied to their capital (Kening, 1997: 9). As exemplified in the

following table, the large MNCs having invested in China tend to concentrate on capital and technology intensive industries, such as automotive, telecommunications, and electronics.

Table 3-3: Leading MNCs in China, 1995-1996
(Unit: "Sales" and "Assets" in million Renminbi Yuan, "Export" in US$10,000)

Rank	Firm	Sales	Assets	Export
1	Shanghai Volkswagen AG	18430.69	8035.01	461
2	Motorola (China) Electronics Co., Ltd	7364.44	4792.04	n/a
3	Beijing Jeep Co., Ltd	5745.93	2878.83	264
4	Guangdong Nuclear Power Co., Ltd	5480.16	34409.05	45880
5	Shanghai Bell Co., Ltd	4545.40	6215.23	3456
6	Southseas Oils & Industrial Co., Ltd	3774.97	3740.62	24525
7	Shenzhen Konka Electronic Co., Ltd	3610.21	2524.10	7112
8	Procter & Gamble (Guangzhou) Co., Ltd	3100.40	2109.57	267
9	Nanjing Jincheng Machinery Co., Ltd	2811.01	1593.06	981
10	Shanghai Mitsubishi Elevator Co., Ltd	2786.17	2846.81	665

- One pound was equivalent to 13.5 Renminbi yuan in 1996.

Sources: "China's top 500 foreign-funded enterprises (in manufacturing) in 1995-6", a report released by the Ministry of Foreign Trade and Economic Cooperation (MOFTEC) in 1996.

But, still, some problems in attracting FDI exist. The main problems are:

- the uneven industrial structure of foreign investment. Almost 50 per cent of foreign investments concentrate on the processing industry, 30 per cent on real estate and hotels. Only less than 10 per cent on infrastructure;
- the efficiency of foreign capital utilisation needs to be raised, and the management system improved. For instance, the quality of some projects tends to decline with the rapid increase of foreign investments. This suggests decreasing

returns to the management functions, the likely solution for which is the remodelling of internal organisation.

- new sources of funds and new forms of utilisation should be explored. For example, 60 per cent of foreign investments are from Hong Kong, Macao, and Taiwan, whilst those from the European countries account for less than 10 per cent (see Table 3-4 as below). New ways of introducing foreign funds such as Build-operate-transfer (BOT) project financing are in the experimental stage.

Table 3-4: Top 10 sources of the FDI stock in China by 1998
(Unit: Billion of US dollars)

Source region	Actual amount	% of total
Total	267.3	100
Hong Kong	138.4	51.79
Japan	21.9	8.2
US	21.4	8.02
Taiwan	21.3	7.96
Singapore	12.2	4.56
South Korea	7.6	2.83
Virgin Islands	6.7	2.52
Britain	6.5	2.45
Germany	3.4	1.29
Macao	3.3	1.24

Sources: *Beijing Review*, 6th December 1999, page 22.

A more serious problem, it can be argued, is the lack of understanding on the importance of R&D by the Chinese government. This has been reflected in government policy and relates to the second point listed above regarding low efficiency of capital utilisation and poor performance of the management systems in some foreign invested firms. As in many developing countries, China offers a variety of incentives to inward investment, such as reductions in taxation, provision of land

or facilities and access to local capital, which will be discussed below. These are balanced by various ownership restrictions, including a 25 per cent foreign investment shareholding to qualify for joint venture status, ceilings on the share of know-how and industrial property in total foreign investment, as well as some limitations on FDI in certain sectors or export requirements (Panagariya, 1995: 32-35). The two ceilings relating to industrial property and know-how are as follows: the proportion of industrial property of the foreign investor cannot be over 20 per cent of registered investment; and know-how's share in foreign investment cannot exceed 10 per cent. Some problems of these policy packages are apparent: the policy package was more suitable for labour-intensive investment than for technology-intensive investment; R&D capacities were not a concern of current policy; and, as a result of the implicit intention to neglect R&D, insufficient attention was paid to human capital development (Lan and Young, 1996: 75).

In the light of these problems, the Chinese government has come up with some new strategies for utilising foreign direct investment in the future. According to Zhang (1996), they can be generalised as follows:

- Making further improvements to the legal system relating to FDI in China. For instance, China is speeding up the process of reviewing and stipulating the managing decrees and acts about BOT and project financing;
- Raising the percentage of FDI in infrastructure, fundamental industries, and high value-added industries to 50 per cent of the total inward investment amount by the end of the year 2000. For this purpose, the Chinese government is to widen the fields open to FDI in a gradual and orderly procedure to increase value added,

and to adopt a series of measures to introduce foreign capital to mid- and west-areas, much of which would be in infrastructure ;

- Widening the sources of foreign funds. Special attention is being paid to diversifying the channels of foreign capital, and raising the weight of the financing in European and American capital markets. The Chinese government is studying new forms for using foreign funds such as BOT, project financing, and enlarging the overseas share issues of Chinese companies.

Although the key problem discussed above has not been addressed, these strategies have produced fresh evidence to suggest that China is determined to attract much more FDI in the future based on an open market, competitive investment environment, and a complete legal system.

3.32 The impact of FDI on the Chinese economy

After nearly two decades of economic reform and opening to the outside world, the Chinese economy has been transformed from a closed economy to a relatively open one. FDI has played an important role in sustaining the upgrading of the Chinese economy, in terms of capital contribution and economic growth, foreign trade and the balance of payments, technology transfer, employment and human resources, regional development and income distribution and economic reform (Kening, 1997: 27). By 1994, FDI had taken a significant share in China's national economy: 10 per cent in industrial output and foreign debt, 18 per cent in fixed asset investment, 37 per cent in foreign trade and 8 per cent in tax contribution (Guan, 1995).

In the foreign trade sector, China ranked 10th in the world in terms of foreign trade volume in 1997, with its imports and exports totalling US$325 billion, leaping ahead from 32nd in 1978 with a trade volume of just over US$20.6 billion (China Daily, 9th February 1998). Foreign direct investment, as showed in the table below, has played a key role in expanding China's foreign trade. Its share in the national total has increased substantially from a minimum 0.3 per cent in 1984 to 41 per cent in 1997.

Table 3-5: Export of foreign invested enterprises and its share in national total, 1984-97
(Unit: 100 million of US dollars)

Year	Export of FIEs	% of Total
1984	0.7	0.3
1985	3.0	1.1
1986	5.8	1.9
1987	12.2	3.1
1988	24.6	5.2
1989	49.2	9.4
1990	78.1	12.6
1991	120.0	16.8
1992	174.0	20.4
1993	252.0	27.5
1994	347.0	28.7
1995	468.8	31.5
1996	637.4	37.2
1997	749	41

Source: *Beijing Review*, various issues.

Along with the huge inflow of FDI and fast expanding foreign trade, China has managed to maintain one of the highest economic growth rates in the world in the past two decades. The average annual growth rate has been 9.5 per cent during 1979

to 1994, with double-digit growth between 1992 and 1996. It achieved an 8.8 per cent GDP increase in 1997, far higher than that of other Eastern Asian countries where the financial crisis had paralysed most economic growth. Especially due to the strong growth of the FDI inflow since 1993, as shown in Table 3-1, China has enjoyed a favourable international balance of payments and national foreign exchange reserves rose from US$19.4 billion to US$156.8 billion at the end of April, 2000, second only to Japan in the world (Singtao Daily, 6th March 1998).

The reasons behind China's success in attracting FDI in the past 18 years, in addition to the preferential policies discussed above, are as follows:

- Economic growth. Since the end of the 1970s, Chinese government has managed to maintain economic growth at a speed only experienced by few countries in world history. During 1979 and 1994, China's GDP was more than quadrupled, and, as noted above growth rates have been among the highest in the region if not the world. According to a World Bank report (World Bank, 1994), the Chinese economy will continue to grow at a fast rate (above 7- 8 %) until 2020. This long term, high growth rate development, coupled with the prospect of liberalisation in key industries such as telecommunications, energy and communication, and extensive privatisation programmes carried out among state owned firms, will certainly create numerous business opportunities for foreign investors. Building up a stronghold in the fast- expanding Chinese market will provide foreign investors a long-term return in a more competitive globalised market.

- Market potential. Based on its huge population (1.23 billion at the end of 1997 according to China State Statistics Bureau, about 22 per cent of world as a whole), China has long been regarded as the largest potential market in the world. "The sheer size endows China with an unrivalled market potential in attracting foreign investment, and China's fast economic growth is turning this huge potential into reality" (Kening, 1997: 22). The Chinese government has strategically used its internal market as a lever to attract FDI, especially investments with high technology, in order to upgrade its industrial competitiveness (Engardio, *et al*, 1996). Since 1992, more and more foreign invested enterprises have been allowed to sell their products internally. Lured by China's expanding market, more and more foreign investors have been investing in China for the purpose of tapping into the Chinese internal market. According to certain surveys of FIEs in China, 87 per cent of Japanese firms and 92 per cent of American firms investing in China rate selling their products in China (i.e., as opposed to exporting from China) as the first aim of investing in this country (Qian and Gao, 1995). This present research on knowledge transfer in China's telecommunications and automotive industries also indicates that the main incentive for the foreign firms interviewed to invest in China is market seeking, rather than that of being enticed by China's cheap labour and other resources.

Kening (1997) argues that political stability has served as a key factor in inducing foreign investors to invest in China. However, on the contrary, it can be argued that, political uncertainty and a still incomplete and inconsistent legal system in relation to FDI have been the main concern of foreign investors up to now (Zhou, 1994: 58).

This may partly explain why the sources of FDI into China have overwhelmingly been overseas Chinese while western investors only make up a small percentage (see Table 3-4). Had the Chinese government addressed this earlier and more comprehensively the FDI in China would have been much larger in volume and much higher in quality, as more western MNCs would have entered to service the huge Chinese market (Child and Lu, 1996).

3.4 The telecommunications manufacturing industry and automotive industry of China

Both the telecommunications equipment industry and automotive industry are key sectors for development in China's economy. While telecommunications equipment manufacturing was identified as a bottleneck to economic development as early as the beginning of the 1980s, it was only partly liberalised in the middle of the 1980s. The automotive industry was granted the green light to take off in the early 1990s, but has experienced much more rapid development. This section introduces the background to these two industries and explains the government policies in spurring growth in these two "special" industries.

3.41 China's telecommunications manufacturing industry

Telecommunications is an infrastructural backbone industry. It is fair to say that under conventional state socialism it is not a priority for development, although a satisfactory level of service is required (Clegg, Kamall and Leung, 1996). However,

since the introduction of economic reform and the policy of opening at the end of 1970s, the Chinese government finally came to the conclusion that without the proper development of telecommunications infrastructure, economic development would be bottlenecked forever. It has attached great importance to the development of the telecommunications sector, making it a focus of economic planning. Telecommunications, along with agriculture, energy and transport, became listed as a priority within national economic development. As a result of the preferential policies and huge investment in the past two decades, and especially in the 1990s, China's telecommunications sector has expanded rapidly, and is playing an increasingly important role in the country's economic progress.

By the end of 1994, China's telecommunications industry had recorded an average annual growth rate of 31.6 per cent for the previous nine years, thereby bringing about an eight-fold increase over the base figure for 1980. China's state monopoly provider, the Ministry of Post and Telecommunications (MPT, which became part of the newly merged Ministry of Information Industry in 1998) had installed a long-distance trunk line network comprising mainly optical fibre cable, digital microwave and satellite communications, as well as a nationwide programme-controlled local telephone network. The total length of long-distance fibre optical cable lines were 820, 000 kilometres in 1995. China built 22 optical trunk lines from 1991 to 1995 and expected to lay 23 more from 1996 to 2000 (*Beijing Review*, 1995).

The country's total telephone exchange capacity increased by 19.61 million lines in 1997, to reach 111 million lines in total, ranking China second in the world behind

the United States in terms of total lines. There are 8.11 telephones for every 100 people (teledensity) in China, and that figure is expected to rise to 9.7 by the end of 1998. In the cities, there are expected to be 30 telephones for every 100 people by the end of 1998, compared with 26.1 by the end of 1997 (*China Daily*, 1998a).

Mobile telecommunications services and data telecommunications have also developed apace, with the number of subscribers increasing by about 170 per cent annually since 1990 (*Financial Times*, 1998b). China had 1 million mobile phone subscribers in 1993, 13.23 million at the end of 1997, 25 million in 1998, and expected to grow by a massive 77 per cent this year to 44 million (FT, 1999), the world's second highest number after the United States. This has already dwarfed the bold forecast by specialists (The country was expected to have 35 million mobile phone subscribers by the end of this century, according to a *Financial Times* survey of 1998 (FT, 1998b).

Table 3-6: The development of China's telephone system

ITEM	1978	1985	1990	1993	1994	1996	1997
Urban and rural telephone network (10, 000 lines)	n/a	n/a	2045	4206	6162	9300	11100
Ownership of telephones (%)	0.38	0.6	1.1	2.2	3.2	7.4	8.11

Notes: "n/a" means not available.
Source: *China Daily*, *Financial Times* and *Beijing Review*, various issues.

China envisages the investment of RMB 500 billion (US$60.24 billion) during the Ninth Five Year Plan (1996-2000) and have invested 124.5 billion yuan (US$15 billion) in the sector's fixed assets in 1997, which is 38.3 per cent more than the 90

billion yuan (US$ 10.8 billion) invested in 1996 (*China Daily*, 1998a). The main reason for this high growth lies in the strategy of Chinese government of encouraging the introduction, absorption and assimilation of advanced foreign technology. This has been possible because the incumbent operator, MPT, has been, as its name indicates, responsible for the entire industry. Accordingly, China has been able to reach the level of more advanced countries by bypassing the traditional transition period required for the development of telecommunications. Various types of telecommunications technology and methods, representing the most advanced world levels, have been extensively introduced into the telecommunications network over the last decade. Technologies such as SDH (Synchronous Digital Hierarchy) and GSM (Global System Mobile or Global Synchronous Mode) have been integrated into the public telecommunications network. Urban telephone systems have been automated, with the rate of digital long-distance transmissions and programme-controlled exchanges in urban areas reaching 80 per cent and 97 per cent respectively. Ninety-eight per cent of inter provincial telephones are fully automated (Financial Time, 1998b).

Despite this rapid development over the last decade, China's per capita telecommunications service level still lags far behind world average levels. In order to meet the soaring demand in the telecommunications sector, China strives to develop all types of telecommunications and information services, including information retrieval, data processing, electronic mail, voice mail, electronic data exchange and other value-added businesses. Overall plans through the year 2000 call for the initial completion of a nationwide public telecommunications network and

raising the technological level of the nation's telecommunications network in line with that of advanced countries. The total capacity of the nation's telephone network is expected to reach 400 million lines by the year 2010, with the ownership of telephones reaching 25 per cent. A broadband integrated service digital telecommunications network, with the capacity to provide interactive-mode multi-media services, is planned to be initially established by then. In addition, all families in provincial capitals and developed coastal areas are planned to have access to optical fibre telecommunications services.

In order to fulfil these ambitious goals, the country has solicited foreign capital to improve its telecommunications facilities and upgrade its technological capacity in the telecommunications sector, with US$6 billion in foreign capital having already been put into use. The Chinese government has developed policies with regard to the introduction of foreign equipment and technology:

First, allowing foreign producers to set up subsidiaries in China (first only joint ventures, then since the end of the 1980s, wholly-owned subsidiary). Priority is given to establishing Sino- foreign joint ventures to transfer advanced equipment, transfer technology and set up local production lines. Foreign businesses are now allowed to participate in telecommunications construction projects, engage in joint ventures to produce equipment, and gain due returns in accordance with equity shares as well as under contractual agreements. Restrictions have been removed on setting up wholly-owned subsidiary of MNCs. Currently there are more than 40 telecommunications equipment production enterprises in China. Overseas businesses

include *Northern Telecom Limited* of Canada, *Nokia* of Finland, *Alcatel Alsthom* of France, *Siemens* of Germany, *NEC* and *Fujitsu* of Japan, *Philips Communication Systems* of Netherlands, *Ericsson* of Sweden, *GPT* of UK, *Motorola* of US. Underpinned by such participation, China now has the capacity to develop and mass-produce program-controlled digital telephone exchanges for domestic telecommunications networks.

Second, allowing local operators to purchase advanced technology and equipment from abroad and foreign providers with a local presence in order to quickly ease the strain on telecommunications facilities in major cities and coastal developed areas. China opened its telecommunications equipment manufacturing market fairly early (Clegg, Kamall and Leung, 1996), and has since become one of the world's leading countries in terms of the level of market openness and the volume of equipment purchasing. MPT of China introduced a network access licensing system for telecommunications terminal equipment that allows users to freely purchase this equipment through public bidding in both domestic and international markets in accordance with technical standards set by the state. As a result, foreign telecommunications manufacturers, especially those with a local presence, have gained a substantial share of this rapidly expanding market. Now, China has become Ericsson's largest market, having overtaken the USA in 1997. Motorola is now building its third production base in Sichuan province after the first two in Tianjin and Suzhou. Its aim is to invest at least US$2.5 billion by the end of this century (*China Daily*, 1998b). Nokia, the world's second largest mobile phone group, has stepped up its presence in the fast-growing Chinese telecommunications market. A

single contract announced in September 1997, worth US$300m, allowed Nokia to expand its network in Fujian province, leading to a fourfold increase in the region's capacity from 600, 000 to 2.4m subscribers by the end of 1998 (*Financial Times*, 1997).

Third, encouraging the expansion of indigenous scientific research and development in order to gradually release China from totally relying on foreign technologies. The Chinese government has allowed local governments to produce favourable policies, such as preferential access to financial resources, tax exemption and government subsidies, etc. to nurture the local producers in pursuit of independent R&D capability. All these policies seem to have met with some success. For instance, after more than ten years' development, there have been a group of Chinese indigenous firms emerging as independent producers with strong R&D capability, such as *Da Tang Telecom, Ju Long (Great Dragon) Group, Shenzhen Huawei Group, Zhongxing Xin Telecom, Jin Peng Electronics, and Southern Telecom Industry* (China Science Report, 1997).

In the telecommunications service sector, however, it is a different story. China appeared determined to achieve its development goal without yielding on a central prohibition against foreign equity participation in actual network operation (Clegg, Kamall and Leung, 1996). All the ventures between foreign firms and indigenous players are carried out on the condition that the foreign partner neither holds shares, nor gets involved directly in telecommunications business operations. However, the latest development indicates that China will allow foreign equity participation up to

50 per cent as part of its package to secure World Trade Organisation (WTO) membership (FT, 1999). Whether this will be realised depends on the economic calculation, the state of China's indigenous operators (MPT and Unicom - the second entrant) and the ascendancy of those interested in reform in the government.

The competition in telecommunications equipment sector is increasingly intense. China's capacity in manufacturing of exchanges reached 15 million lines in 1997, accounting for 90 per cent of the total installed in the same year. It is predicted that in the next two years, manufacturing capacity is to grow to 20 million lines -- far beyond demand. "Equipment vendors have even been willing to sell a line for $8, while it was $150 three years ago" (FT, 1999:7). In the mobile equipment market, the prices of handsets supplied by mainly Motorola, Nokia, Ericsson, Alcatel and Nortel have dropped significantly over the past two years, due to an abundance of choice (*FT*, 1998b).

It seems clear from the above description, that the telecommunications manufacturing industry is a special industry of China, which is highlighted by the key role it plays in the development of national economy, the strategic priority in the policy agenda of the Chinese government accompanied by huge investment on a sustainable level, the extraordinary government support given to technology transfer and the nurturing of local R&D capability, and the tight control enforced by MPT. All these created opportunities, but spurred unusual competition as well. Although great progress has been made, domestically produced telecommunications equipment in general still fails to meet the country's needs for the construction of

modern telecommunications networks. China will have to continue importing modern technology and equipment that is badly needed for the construction and upgrading of telecommunications networks, while striving to enhance internal development and production capacity.

3.42 China's automotive industry

The Chinese automotive industry was established in 1953 when the First Auto Works (FAW) was put into operation in that year. The main purpose was to provide trucks for industrial and military use. Since the 1980s, it has developed more rapidly, both in quantitative and qualitative terms, particularly through joint ventures with Western manufacturers. The industry's history can be divided into two stages:

First stage, 1953 – 1978. Following the founding of the People's Republic of China in 1949, Chinese government carried out extensive Soviet-style industrial policies. Central planning and administrative guidelines directed decisions as to what and how much should be produced. During this period, two assemblers, FAW and Second Auto Works (SAW, now called Dongfeng Group) were established and a complete range of parts suppliers were set up, which constituted the foundation for China auto industry. By 1978, the annual production of Chinese-made auto vehicles was 150,000 units. The passenger car industry was not developed as in the western economies. Cars were the prerogative of a relatively small number of high-ranking officials. Only a couple of thousand units were produced each year; most vehicle production comprised trucks.

Second stage, 1979 - present. With the implementation of open-policy and economic reform since the end of the 1970s, the Soviet style planning economy has been gradually transformed into the "socialist" market economy. Partly as a consequence of this reform, China has begun to realise its economic potential and has exhibited one of the highest growth rates in the world over the last 20 years (EIU, 1997). However, unlike the telecommunications industry, the automotive industry was ignored by the Chinese government in the 1980s due to the conservative central planning mindset which regards car as luxury for a few. China paid a heavy price for this: it had to import 1.02 million units of cars during 1980-1995 (Yu, 1997: 184), spending tens of billions of US dollar worth precious foreign hard currency when the national economic development was restricted by the availability of it. In addition, having seen the pivotal role played by the automotive industry (essentially car production) in the economy of advanced countries, the Chinese policy makers finally designated the automotive industry as one of its pillar industries at the beginning of the 1990s. Production of all vehicles has risen considerably in recent years, especially cars and motorcycles. The output of all vehicles rose from 180,000 units at the beginning of the 1980s to 1.46 million in 1995, with annual increases of around 13 per cent. Motorcycles' production has grown from a negligible number to 7.83 million; and cars, from 5418 units in 1980 to 400,000 in 1996 (Automotive Industry of China, 1997: 11; EIU, 1997).

Current production volumes in China are modest by the standards of advanced industrialised nations. However, the Chinese government has set ambitious targets

for the development of the automotive industry. In 1994 the government was predicting demand to be 2.5 million vehicles of all types by the year 2000 (up from sales of 1.4 million in 1993). More recent estimates are for sales in the year 2000 to be 1.96 million, of which approximately 0.5 million will be passenger cars (EIU, 1997).

Although the automotive industry in China has grown rapidly, it faces a number of problems. First, the industry is relatively scattered and fragmented, with 122 assemblers, more than 150 bus producers, 450 vehicle-refitting factories and 119 motorcycle makers in 1995 (Automotive Industry of China, 1997: 7). One of the reasons for this is competition between the various provinces and local governments, many of whom have sought to develop their own automotive operations. Secondly, the industry suffers from a lack of R&D capability. The main technologies used in the beginning of the 1980s were still based on those transferred from the former Soviet Union in the 1950s, about three to four decades behind the those of the USA, Japan and Western Europe. It also copes with weak base of component manufacturers. Most of the assemblers have to rely on their internal supplies, or import from international markets. Thirdly, from the latter part of 1993 the central government began to apply a tight monetary policy, which has led to a weakening of the automotive market. In addition, legislative measures to control traffic congestion since the beginning of the 1990s have further dampened demand. Finally, lack of independent R&D capabilities has hindered the development of the indigenous Chinese industry.

In order to address these questions, the Chinese government issued the *Industrial Policy for the Automotive Industry* in 1994. This policy has four key objectives: to establish large-scale groups of saloon and light truck producers (to replace the small-scale, scattered manufacturers); to improve the components industry; to create automotive product development capabilities; to encourage individual car ownership.

In order to promote the competitiveness of Chinese automotive manufacturers through utilising foreign capital and technologies, the Chinese government has created an explicit policy link between joint ventures and the issue of knowledge transfer. It decreed that all the car assembly operations must be joint ventures with Chinese enterprises, and foreign partner cannot hold more than 50 per cent share in any circumstances. Furthermore, the Chinese government produced three lists of components according to China's indigenous production capability, allowing joint venture as the only form of foreign entry on producing those most demanding ones and local partners must hold no less than 50 per cent of the equity. At the same time, the Chinese government extends preferential treatment to those following its policies, such as access to cheap loans, foreign currency allocation, less restrictions to the Chinese market, favourable tax and tax exemption on reinvestment, etc. This represents a huge effort by the Chinese government to encourage the transfer of advanced technologies from foreign producers.

Attracted by the huge potential of the Chinese market, there is no shortage of foreign candidates willing to establish joint ventures with local producers based on

technology transfer. It is generally accepted that there are eight significant car assemblers in China, all of which are in partnership with foreign producers: the 'big three' (Shanghai Volkswagen, FAW Volkswagen and Dongfeng-Citron), the 'small three' (Guangzhou-Peugeot[28] , Beijing Jeep/Chrysler and Tianjin/Daihatsu) and the two mini projects (Suzuki and Fuji Heavy Industries). The characteristics of these producers are shown in Table 3-7. The top six of these enterprises accounted for 90% of car sales in 1996 (EIU, 1996).

Table 3-7: Major passenger car assemblers in China

	Chinese Partner	Western Partner	Nature of Partnership	Date	Products	1996 Reg's	Planned Capacity
Beijing Jeep Corporation	Beijing Automotive Works	Chrysler (US)	Joint Venture	1983	Cherokee 4 wheels drive	29,000	150,000
Shanghai Volkswagen	Shanghai Tractor &Automotive Corporation	VW AG (Germany)	Joint Venture	1985	Santana, Santana 2000	165,000	300,000
Tianjin Daihatsu	Tianjin Mini Auto Works	Daihatsu (Japan)	Technology tie-up	1985	Charade	80,000	450,000
Guangzhou Peugeot	Guangzhou Junda Group	PSA (France)	Joint Venture	1985	504/505	3,000	Sold to Honda Nov. 97
Dongfeng Citron	Dongfeng Automotive Corporation	PSA (France)	Joint Venture	1992	Citron ZX	1,500	300,000
FAW-VW	First Automotive Works	VW AG (Germany)	Joint Venture	1991	Jetta Audi 100	37,000	360,000
Guizhou Fuji	China Guizhou Aviation	Fuji (Japan)	Joint Venture	1993	Subaru Rex	1,500	150,000
Chang'an Suzuki	Chang'an Machinery Manufacturing	Suzuki (Japan)	Technology tie-up	1983	Suzuki Alto	6,859	350,000

Source: EIU, 1996.

Indeed, the Chinese government strategy has met with increasing enthusiasm. A policy of freezing new joint venture applications in the automotive industry was

[28] Peugeot's interests in Guangzhou-Peugeot was sold to Honda in November, 1997.

loosened from 1997. This resulted in the signing of several new joint venture deals. Apart from Honda's take over of Peugeot's share in the joint venture with Guangzhou Junda Group, General Motors was granted a license to set up a 50-50 joint venture with Shanghai Automotive Industry Corp (SAIC) and the total investment in the project was US$1.52 billion. The joint venture is designed to eventually produce 100,000 Buick sedans every year from 1999 (China Daily, 1998c). In comparison with previous deals, the technologies involved in these recent joint ventures are much more advanced, underlying success of the Chinese government strategy in strengthening its automotive industry competitiveness through technology transfer. The same picture can be see in component sector. For example, Mitsubishi, one of Japan's leading vehicle makers, won approval from the Chinese government to set up a joint venture engine manufacturing plant in Shenyang, with initial investment of RMB 730 million Yuan (US$88 million). The company expects to produce 150, 000 units a year of both engines and transmissions (FT, 1997). Other big car producers, such as Ford, Toyota, Nissan and Fiat, in 1998, were all said to be in discussion with the Chinese government on establishing their own joint ventures in near future.

In retrospect of the development of China's automotive industry, one can easily conclude that it is not a conventional industry. Rather, it is a special one in that, apart from great market potential and huge government investment, strict government control applies, which hindered the development of this industry before the 1990s, but also facilitated its take off in the 1990s. If compared with telecommunications manufacturing industry and other typical industries, government control in this case

does not only mean restrictions on market access, equity requirement, sophistication of technologies transferred, and so on. It also extends to some specific aspects. One example is the central government stipulates the prices at which vehicles must be sold (+/-10 per cent), while in telecommunications manufacturing industry the government takes a hands off approach in this respect. In addition, some local governments place restrictions on the use of certain vehicles within their area of jurisdiction, based on intense regional rivalry. Shanghai, for example, refused to license the Tianjin-produced Charade for use as a taxi (taxis represent a major proportion of car sales in China). The identification of extensive government control as the specialness of China's automotive industry is helpful, because this will send a message to foreign automobile makers, that although there is clearly considerable potential in the Chinese market, but many challenges lie ahead in realising this potential. The withdrawal of Peugeot from its venture with the Guangzhou Group in November 1997, and their replacement by Honda, demonstrates that it may be those with a long-term perspective, extensive financial reserves and skills to cope with government control who can ultimately remain in the Chinese market.

3.5 Summary

Since the end of the 1970s, China has quickly emerged as one of the most important investment sites around the world. FDI has been strategically utilised by the Chinese government as an effective tool of spurring economic development and strengthening industrial competitiveness. However, the Chinese business environment remains distinctly different from western counterparts politically,

economically and culturally. Issues relating to the features of the business environment in China, government policies towards FDI, and the profiles and specialities of the two industries in this research were discussed. Extensive evidence from the research reviewed in this chapter indicates that the Chinese government has been intimately involved in the ventures. It is also evident that the policy of utilising FDI has largely speaking an efficient way of transforming its state owned firms (in the case of the automotive industry) and of upgrading its backbone industries (i.e., telecommunications equipment industry and automotive industry). More research, however, is needed to resolve the uncertainties facing foreign investors in respect of how to operate successfully in such an environment.

Chapter 4 Company Profiles

4.1 Introduction

This chapter intends to present some factual information on the four firms used in this research: Shanghai Bell and Motorola in the telecommunications, and Shanghai Volkswagen and Beijing Jeep in the automotive industry. These four firms are among the largest foreign invested enterprises in the Chinese market (see Table 3-3 for details). Apart from the natural aspects of the firms, such as when these Chinese affiliates were established, the partners involved, and their products and employees, the key purpose of this chapter is to outline what technologies were transferred from the western parents to these affiliates, and how the technological assimilation has been carried out within them up to now. This is to lay a foundation for our analysis in Chapter 6 and 7.

4.2 Profile of Shanghai Bell Telephone Equipment Manufacturing Co. Ltd

Shanghai Bell Telephone Equipment Manufacturing Co. Ltd, a Sino-Belgian joint venture, was established on 30th July 1983. The original contract was for 15 years with a 5 years' extension option. It was replaced in 1992 by an expansion contract until 2013. Its registered capital is US$80 million (in 1983). The partners involved in

this joint venture include: Postal & Telecommunications Industry Corporation of China (60 per cent), Alcatel Bell (32 per cent) and Belgian Government (8 per cent).

After fourteen years of establishment, Shanghai Bell has become one of the pillar enterprises (a leading manufacturer of digital switching systems) in the Chinese telecommunications manufacturing industry, based on knowledge transfer from Alcatel Bell. All the technologies involved, including product technology, production technology and test and quality control technology, were all transferred from the Belgian side. The number of staff of Shanghai Bell is around 1500, among which more than 50 per cent are university-educated professionals. System 1204 (S12) digital switching system, the main product of the company, covers all over the country in more than 2000 exchanges with a total capacity of 16 million lines. It manufactured programme-controlled digital exchanges with a combined capacity of 6 million lines per year, and increased its product localisation rate to over 80 per cent in 1996. The sales revenue in 1995 was US$535 million.

While S12 public digital switching exchanges (i.e., remote, local, tandem, toll, international, intelligent net work) as the main products, Shanghai Bell's products category also includes:

- Rural system exchanges and business system exchanges
- SSA® for hotels, schools, factories and hospitals, and transmission equipment
- Access network system
- Custom CLSI® chips
- Standard rack of GSM

- Series products for wide band information highway
- Software products

① SSA: Small Stand Alone (exchange)

② CLSI: Customised Large Scale Integration

Table 4-1: The key entries in Shanghai Bell's chronology since its establishment

30/07/1983	Contract signing
01/10/1985	First manufacturing output
15/12/1986	First of its switching products was put into use
01/01/1987	Building 2 inauguration
1987	Introduction SSU-12 Production
06/09/1988	Belling Joint Venture contract signing
1988	First year of profit
1988	First year of "royalty"
1990	Capacity increase from 300 to 600 KL* /year
1990	First export contract
1992	Capacity increase from 700 to 1700 KL/year
25/09/1992	Contract extension till 2013
1992	PRTEC① Joint Venture Foundation
1992	SBB② Foundation
1993	Capacity increase from 1700 to 2800 KL/year
1993	Beijing BOT Investment & Development Co. Ltd
05/1994	NEATC③ Joint Venture Foundation
09/1994	SAKHC④ Joint Venture Foundation
10/1994	SBABC⑤ Joint Venture Foundation
12/1994	SBAMC⑥Joint Venture Foundation
12/1994	TEMIC⑦ Joint Venture Foundation
1995	Capacity increase from 2800 to 4500 KL/year
1995	BBTEMC⑧ Joint Venture Foundation
1996	Urumqi Bell; Sino-Russia Telephone Co. Ltd

* KL: Kilo Lines
① Pearl River Telecom Equipment Co. Ltd
② Shanghai Bell Belgium
③ North East Asia Telecom Co. Ltd
④ Shanghai Alcatel Kang Hua Cable Co. Ltd
⑤ Shanghai Bell Alcatel Belling Co. Ltd
⑥ Shanghai Bell Alcatel Mobile Co. Ltd
⑦ Shanghai TEMIC Microsystems Co. Ltd
⑧ Beijing Bell Telephone Equipment Manufacturing Co. Ltd

In order to consolidate its leading position in China, Shanghai Bell, with a total investment of US$172 million, built its Pudong Plant, which was completely finished and put into operation in 1995. This large plant includes components manufacturing and assembly and test workshops.

The components manufacturing department has a total space of 20256 square meters, comprising two main production lines: piece parts manufacturing (PPM) and printed circuit board manufacturing (PBM). They mainly provide the metal & plastic piece parts and printed circuit board (PCB) needed for system 12 assembly.

The PPM production line is equipped with the state-of-the-art production facilities, including computer-controlled laser cutting machinery, computer-controlled punching machinery, computer-controlled hydraulic bending machinery, auto spot welding machinery, robot welding machinery, automatic plastic injection machinery and an auto power coating line.

The PBM line is equipped with the most advanced computer-controlled drilling and milling machine, panel and pattern lines, laminator, exposer, develop etch line, multilayer press, X-ray drilling machine, solder mask coating line and computer aided manufacturing (CAM) system, with a projected production capacity of 500 square meters. The PBM line is equipped to produce high- quality products with smaller holes, higher density and more multilayers to meet the requirements of J generation of S12 system.

The assembly and test workshop were put into operation in July 1995, mainly manufacturing the hardware of S12 switching system. The workshop, characterised by large space and brand new layout, is equipped with the state-of-the-art facilities such as SMD (Surface Mounted Device) production lines and wave soldering machine. The production capability is among the highest in the world. Currently still producing E family of S12, the company is upgrading that to J family. In order to ensure the quality of the product, the workshop started the application of MRPII (material management system) in early 1996.

Since its establishment, Shanghai Bell has dedicated its efforts to extensive assimilation through the introduction, design, absorption and innovation of both old and new products and relevant technologies from Alcatel Bell. First, in the course of assimilating the transferred technologies and developing its localisation capability, Shanghai Bell adheres to the strict procedures for quality and the principle of quality first. Since 1987 more than 1,000 items of different specifications in 15 categories have been provided covering CLSI, sophisticated high-current and high frequency filters, signalling cables of various types, multi-layer PCBs and raw materials, metal and chemical materials, etc. A large-scale coordinative production network of 85 accessory factories with more than twenty- thousand employees for S12, has been formed, which eventually promoted the technical programme and business development of the domestic component industries. By the end of 1995, the localisation rate of Shanghai Bell products reached near to 70 per cent and the total annual output of these supporting factories exceeded to 1 billion RMB yuan. Shanghai Bell has wholly assimilated the S12 hardware and software technologies

and has effected some upgrading in some fields. At the same time, an independent technical and management team has been established.

Furthermore, some adaptations and developments have been made to enable S12 and other transferred products meeting the Chinese market better. In recent years the Technical Development Department of Shanghai Bell developed new products based on S12 in line with the specifications defined by the Ministry of Post and Telecommunications (MPT) of China. It was not only the very first one in the country to win the "China No.7 Signalling System Validation Acceptance Qualification Certificate" but also the provider of corresponding signalling systems for telecommunications networks in North Korea, Vietnam, Laos and Russia. This enabled the products of Shanghai Bell to enter the world telecommunications market.

Second, training is the other area to which Shanghai Bell has paid attention in its process of assimilating the transferred technologies. The Training Centre of Shanghai Bell has become well qualified in the last seven years to provide training for ordinary maintenance staff up to high-level engineers, to meet the requirements of the customers. By the end of 1995 the accumulated number of the trainees reached 14300. Moreover, to cope with the needs of the customers, eight branch- training centres were successively established in Beijing, Nanjing, Changchun, Changsha, Wuhan, Nanning, Jinan and Suzhou. Two contracted training bases are consigned to Zhujiang Telecom and Northeast Asia Telecom. At present a training network covering whole China is in the preliminary stages of formation.

Shanghai Bell was awarded, in six consecutive years, from 1989 to 1994 the honour as one of the "Top Ten Best Joint Ventures". In 1995-1996 Shanghai Bell ranked 76 among 500 large-scale industrial enterprises in China, and took first place with the best economic results of the electronics and telecommunications equipment manufacturing enterprises, and the fifth place in terms of total sales among China's top 500 foreign-funded enterprises.

4.3 Profile of Motorola (China) Electronics Co., Ltd

Motorola is one of the world's leading providers of wireless communications devices, semiconductors and advanced electronic systems and services. The company's major product groups include cellular communications equipment, electronic automotive components, defence and space electronics and computers. Motorola is a leader in cellular phones, pagers, two-way radio and commercial code division multiple access (CDMA) technology.

Motorola's first investment in China took place in 1987 with the set-up of a sales and marketing office. Since then, the company has enjoyed rapid growth. On 25th March 1992, Motorola (China) Electronics Ltd (MCEL), a wholly-owned subsidiary, was officially established in Tianjin's Economic and Technology Development Area (TEDA). In June of that year, Motorola broke ground on its first major manufacturing facility in TEDA. The facility became operational in March 1993, and manufactures pagers, cellular phones, communications components and

semiconductors, largely for sale in China and other markets in Asia. In November 1995, Motorola began construction of a large integrated circuit wafer fabrication plant, also in the Tianjin Area. The semiconductors manufactured at the plant supply makers of automotive communications, personal computers, peripherals and digital products. By the end of 1997, total investment reached US$1.2 billion, which was the original goal for the end of the century, making Motorola one of the foremost foreign investors in the electronics industry in China.

Motorola is the largest American investor in China, and has a holding company registered in Beijing, a wholly-owned venture in Tianjin and is involved in six equity joint ventures, five co-operative projects and dozens of other significant investments. It has made stunning progresses in the Chinese market shortly after its establishment. For example, it produced half a million unit of mobile phones, and more than one million unit of pagers in 1995 alone, about 50 per cent and 70 per cent of China's output that year respectively (Yu, 1997: 119). Motorola's 1996 exports to China (including Hong Kong) totaled US$3.1 billion, approximately 11 per cent of the company's total worldwide revenues. Motorola exports to China from the United States totaled nearly US$1 billion (by 1996), supporting jobs in many states, including Arizona, Florida, Illinios and Texas.

Motorola's milestones in China are indicated in Table 4-2 on next page.

Motorola declares that it follows a four-point business strategy that guides its investment in China (Bowers, 1997), which is the cornerstone for Motorola's

participation in China's electronics industry. The first point of it is continuous investment and technology transfer. Attention has been placed on the establishment of world- class manufacturing in this host country. To date, Motorola's Tianjin facility has a semiconductor plant, a pager plant, a cellular phone plant, a component plant, and a power source parts plant. In order to improve the level of technology in domestic semiconductor production, a further investment of 720 million US dollars was used in 1995 in building a semiconductor wafer fabrication factory with state-of-the-art technology transferred from the headquarters of Motorola.

Table 4-2: The key entries in Motorola (China)'s chronology in China

1971	First Motorola 2-Way radio system was installed in Shanghai Customs.
11/1986	Bob Galvin, Chris Galvin and Carl Lindholm, three executive directors, visited China.
06/1987	Opened first representative office in Beijing, China.
03/1992	Wholly-owned Motorola (China) Electronics, Ltd. was established.
03/1993	Began production in TEDA (Tianjin Economic-Technological Development Area).
05/1993	Opened Motorola University in Beijing.
02/1995	Established the first joint venture in China in Leshan, Sichuan Province.
09/1995	2nd increase to Motorola's China investment.
11/1995	Began construction of large-capacity integrated- circuit wafer fabrication plant in Xiqing, Tianjin.
1996	Achieved $3.1 billion in exports to China & Hong Kong, and over 9,000 Chinese employees.

With the construction of each facility, a steady flow of advanced production skills, technology, and equipment has come to China. For example, at the current semiconductor plant using the latest technology generated in the USA, the assembly and testing of linear integrated circuits (IC) and microprocessors have passed the relevant international standards. The plant's automatic assembly production area

provides a dust-free work environment and complements the most advanced saw-machines and wire bounders.

Motorola (China) attached great importance in assimilating the cutting-edge technologies transferred into its Tianjin site. First, it puts intensive training at the centre of its business strategy in China, as it does in all of its affiliates around the world. The company requires that every single employee attends at least five days training each year. In fact, Motorola exceeded this goal in 1996 and provided an average of seventy class hours of training per employee in China. A total of 19,000 student-days of classes were taught in 1996, spread among 130 different courses. The figure for 1997 was 27,000 student-days of training.

Motorola (China) not only requires each employee, regardless of position or function, to undergo a minimum of one week's training each year, but also provides training courses for distributors, suppliers and business partners. In addition, Motorola offers management education courses for Chinese government officials, including exchanges with Motorola operations overseas.

Second, Motorola (China) invested heavily in R&D facilities and partnerships, to not only facilitate its technology assimilation and adaptation, but also explore some latest development in the lines of business concerned, based on the competitive, but cheap, technological capability available locally. It has established a software centre, a mobile telecommunications products development centre, a manufacturing technology research centre, and a paging research and development centre in

addition to other scientific research and development services. All these are to provide research and development services for all divisions of Motorola. Motorola has entered into five joint development projects to conduct research and to develop its communications and computer technology. It has undertaken these projects together with leading research institutions in China such as Tsinghua University and the National Research Centre for Intelligent Computing Systems, as well as enterprises like Legend and the Xi'an Datang Telephone Corporation.

Table 4-3: Motorola's cooperative projects in China

Name	Partner	Function	Location
Motorola-NRCIC Joint Research and Development For Advanced Compute Communication Technology Laboratory	National Research Centre for Intelligent Computing System (NRCIC)	Research and development of advanced computer Technologies	Beijing
CIG-Datang Joint Cooperation sub-system and the SP30	Xi'an Datang Telephone Corporation	Research and development of V5.2 interface between between the Will CDMA radio switching sub-system	Xi'an Shannxi province
Tsinghua-Motorola SPS MCU Development Centre	Tsinghua University	Software Development	Beijing
CIG-Jinpeng Joint Cooperation	Jinpeng Electronics Information Machine Co. Ltd	Research and development of V5.2 interface between the Will CDMA radio sub system and the SP30 switching system	Guangzhou Guangdong province
Legend-Motorola Research Centre	Legend Group Co	PowerPC cooperation	Beijing
Huaguang-Motorola Research Project	Huaguang Group and the Ministry of Information Industry	Develop Huaguang branded computers based on PowerPC and MacOS	Beijing

Source: Motorola in China, 1997, page 4.

The latest cooperative project is Beida-Motorola Semiconductor Development Centre, established on 7th April 1998. The Chinese partner is Beijing University, one of the elite universities in China. Motorola will invest US$1 million in this project (People's Daily, 1998).

Third, enabling technology transfer through local sourcing. Motorola has been trying to identify local suppliers for the key components of all equipment manufactured by the company's ventures in China. In 1996, Motorola spent a total of US$473 million on locally-sourced components, materials and services, double the amount from 1995, and a figure that represents 42 per cent of total expenditures. The company expects to spend US$1 billion annually on locally sourced products from direct and indirect materials suppliers in China by the end of the century. It intends to accomplish this by forming partnerships with Chinese suppliers, helping them in the process to improve management efficiency and quality control systems. In addition, Motorola provides suppliers with designs and new technology, and it helps them secure credit for necessary capital improvements, and facilitates joint ventures with appropriate foreign suppliers. In 1996, Motorola's suppliers received 150 student days of training in nine specially-designed courses.

This approach has enabled Motorola (China) to develop a pool of local suppliers that has already grown to 700 across China. With Motorola's help, these suppliers were able to export US$80 million worth of products in 1996, a figure that doubled in 1997. Motorola has also helped local companies grow and improve their technology,

an initiative that dovetails with the Chinese government's strategy for upgrading state-owned enterprises.

Fourth, facilitating technology transfer and utilisation by developing joint ventures with local manufacturers. Since March 1995, Motorola has formed six joint ventures with local partners in China to manufacture a range of high-technology products, from pagers and multi-media computers to CDMA (Code Division Multiple Access) infrastructure and semiconductor products. These joint ventures were claimed to offer opportunities for Motorola to bring cutting edge technology and management skills to its partners, in order to manufacture the highest quality products for the Chinese and export markets.

Motorola has always placed great importance on its product quality. To improve both products and services for the customer, in addition to utilising high technology, employees are expected to actively participate in quality control. "TCS" (Total Customer Satisfaction) teams provide opportunities for employees to participate in and oversee technological and process innovations. Each team is composed of workers from one or more work areas using their spare time to analyse and find solutions for workplace problems. As a result of its quest for quality excellence, the Semiconductor Plant and the Pager Plant both received the ISO 9002 international quality certification on 18th May and 15th December 1994 respectively, which allows the products of these two plants to be shipped anywhere in the world without import quality inspections.

Table 4-4: Motorola's joint ventures in China

Name	Partner	Product	Location
Leshan-Phoenix Semiconductor Co. Ltd	Leshan Radio Co., Ltd	Semiconductor components & products	Leshan, Sichuan Province
Nanjing Power Computer Ltd	Nanjing Panda Electronics Co. Ltd	Multi-media computers	Nanjing, Jiangsu Province
Shanghai Motorola Paging Products Co. Ltd	Shanghai Radio Communication Equipment Manufacturing Co.	Motorola's high speed FLEX pagers	Shanghai
Hangzhou Motorola Cellular Systems Ltd	China National Posts &Telecommunica-tions Industrial Corporation	CDMA digital cellular infrastructure equipment and services	Hangzhou Zhejiang Province
Hangzhou Motorola Cellular Subscriber Ltd	China National Posts & Telecommunications Industrial Corporation	CDMA digital cellular subscriber products	Hangzhou Zhejiang Province
Shanghai Motorola Automotive Electronics Co. Ltd	Shanghai Instruments Corporation (Group)	Automotive electronics control units and accessories for vehicle systems	Shanghai

Source: Motorola in China, 1997, page 3.

Due to the nature of its investments, its transfer of high technology and its good corporate citizenship, Motorola has enjoyed solid support from the Chinese government at all levels. In 1995, the company was presented with two certificates by the Chinese government: the Advanced Technology Enterprise Status Certificate and the High-Tech Enterprise Status Certificate. In 1996, Motorola was second among the Top 500 Foreign-Invested Enterprises in China in terms of total sales. These awards are tangible evidence of the government's recognition of Motorola's

on-going commitment to transfer advanced technology to its operations in China, and its achievements in research, development, production, sales and after-sales service in the Chinese market.

4.4 Profile of Shanghai Volkswagen

The Shanghai Volkswagen Automotive Company Ltd (SVW) is a Sino-German joint venture established in 1984. The shareholders of SVW are: Volkswagen AG of Germany (with an interest of 50 per cent), Shanghai Automotive Industry Corporation (25 per cent), Bank of China Shanghai Trust and Consultancy Company (15 per cent) and China National Automotive Industry Corporation (10 per cent). Up to now the registered capital of the company has increased to RMB 2.3 billion in 1995 from RMB 160 million when the joint venture contract was first signed in 1984.

Located in Anting Industrial Zone on the west outskirts of Shanghai, SVW is made up of three plant areas, i.e. Luopu Road Area (Car Plant I), Miquan Road Area (Car Plant II) and Changji Road Area (Engine Plant), covering 650,000 square meters of land in total with a floor space of 416,000 square meters.

From 1985-1995, SVW made a total investment of RMB 3.5 billion in its Phase I and Phase II constructions. With the completion of Phase II construction, in which an investment of RMB 2.5 billion was made, SVW has an annual production

capacity of 300, 000 cars and corresponding number of engines. At present the company has about 7,000 employees, of whom 23 are expatriates.

Table 4-5: The key entries of Shanghai VW's chronology

10/10/1984	Signing of the joint venture contract.
01/09/1985	Shanghai VW started operation.
07/1986	Started the manufacture of Audi 100.
01/08/1986	Started the manufacture of Santana Variant.
29/09/1986	The 10,000th Shanghai Santana rolled off the production line.
27/03/1987	SVW decided to increase its capacity to 60,000 units per year.
23/10/1987	The assembly line of the engine plant went into operation.
01/07/1988	Santana Localisation Community was inaugurated.
24/08/1988	SWV Training Centre was completed.
21/10/1989	The paint shop was completed.
15/05/1991	SVW reached the volume target of 100 cars per shift.
20/10/1991	Began Phase II construction and developing new Santana with VW.
28/01/1992	The total turnout of Shanghai Santana reached 100,000 units.
30/04/1994	Santana 2000 passed the national technical appraisal.
29/09/1994	SVW decided to increase its capacity to 300,000 units per year.
26/10/1994	SVW R&D centre was completed.
27/12/1994	Phase II construction was finished.

What was transferred from VW to Shanghai VW is the entire technology of producing Santana car, which had been developed by VW for its European and South American markets. Each Santana car consists of more than three thousands of parts. To produce these parts and assembly them at the stringent German quality standard was a huge challenge to this Chinese affiliate. The main ways of assimilating the technologies of producing Santana are as follows:

Improving employee competencies

No firm can expect to achieve fully assimilating the transferred technologies without a highly qualified work force. Shanghai VW has more than 10,000 employees with an average age of 33, of whom a quarter has received education at or above the level of secondary technical school. Ever since its establishment, the SVW has always attached importance to personnel training. It offers secondary school graduates vocational courses, in which the German mode of "Dual Track Training" is adopted. To date Shanghai VW has produced up more than 400 skilled young employees. In addition to this, the firm has opened up a variety of channels for personnel training, such as pre-post training, manager training, overseas training, spare time courses and full time training in universities. According to approximate statistics, from 1985 till 1994 a total of 19,840 person-times (or equivalent) training of different kinds were carried out, of which 380 person-times were trained overseas.

Shanghai VW also employs many German experts to facilitate the assimilation of the transferred technologies on site. Since its establishment, Shanghai VW has employed 107 long-term (about 3- year stay) German specialists in all, and on average about 200 short-term foreign specialists every year.

As a result of these measures, Shanghai VW now boasts a team of specially-trained people who are competent to handle matters of organisation, production and business management, as well as a work force that is capable of modern car-manufacture.

Continuous localisation

An important step in ensuring a high level of parts localisation is the availability of qualified suppliers. By adhering to the technical standards of VW, it is possible to establish a parts supply industry at world technical standards. In the past years SVW has made considerable efforts to select qualified suppliers and to assist them to introduce and apply advanced technology from abroad, to organise their production processes, set up strict quality assurance systems, and to train their personnel. Moreover, in order that there should be no quality failure in the production of local parts, SVW subjects each and every local part to a set of strict tests and adopts on the cars only those that have successfully passed all the highly demanding processes. At present SVW has about 200 local suppliers that are able to provide it with parts in quantities. While making parts and components not only for Santana cars, but for cars of other automakers in China as well, these suppliers are playing an important role in China's effort to upgrade its car-making industry.

In the past 13 years, Shanghai VW, in collaboration with all the parts suppliers, has carried out extensive parts localisation programmes, and the local content rate has kept rising. In 1991, of all the carmakers in China, Shanghai VW was the first to achieve the local content rate of 60 per cent and successfully localise the five major assemblies, and therefore the first to get the customs duties on its CKD (Complete Knock Down) import parts reduced. In 1993 the local content further rose beyond 80 per cent and exceeded 85 per cent in 1994 from only 2.7 per cent at the initial step in

1985. This remarkable achievement has not only laid down a solid foundation for it to further increase its output and cut down the cost, but also has pushed a great number of parts suppliers to higher technical level and further development. It indicates that, by way of introducing, absorbing and assimilating advanced technology, China's automobile supply industry has taken shape, and become capable of making car parts in conformity with international standards.

Strengthening R&D capability to carry out adaptations

Specialist engineers at Shanghai VW have made quite a number of adaptive improvements to the main product "Santana" based on the advanced technology transferred to China from overseas. This has ensured that the models are better suited to the road conditions in China and meet local customer requirements. In addition, adapting to the changing market situations, Shanghai VW has developed a new model of Santana jointly with VW and Autolatina, the VW's affiliate in Brazil. SVW continued to make further improvements on the new model according to VW standards. A much-enhanced product of this model, Santana 2000 GTI, was put into market in 1998. The successful joint development of Santana 2000 helped to build up and temper a team of Chinese research and development specialists. This exemplifies that China's automobile industry is advancing in terms of its technical ability.

Now Shanghai VW has started to work out a ten-year programme for specialist development as well as product development. It has also introduced from abroad a

complete CAD system for styling, data, designing, simulation and prototype building. Additionally it has acquired instruments, facilities and equipment for analyses, tests and experiments of parts and components, so as to build up the resources for future research and development.

Table 4-6: Essential figures for Shanghai VW, 1985-1997

	Sales (Million RMB)	Output ('000 units)	Sold ('000 units)	Employees (persons)
1985	62.3	1.73	1.69	1752
1986	422.5	8.90	8.37	1915
1987	714.3	11.00	10.54	2082
1988	1142.4	15.55	15.54	2352
1989	1222.3	15.68	15.58	2684
1990	1822.9	18.54	18.52	3047
1991	3575.5	35.00	33.86	4368
1992	7108	65.00	65.94	5907
1993	10528.9	100.00	100.02	6410
1994	12710	115.33	115.30	7142
1995	18430	160.07	159.75	9318
1996	24306	200.22	200.03	10333
1997	26316	230.44	230.19	10009

Source: Shanghai VW Annual Report, 1997, page 40.

In the Joint Venture Contract, the annual capacity of Shanghai VW at the initial stage was set at 30, 000 cars only. After thirteen years' continuous investment on the one hand and renovation on the other, SVW's products are well received by the users for their style, quality, price and after sales service and have become the models with the greatest population in China. Shanghai VW has climbed to current annual capacity of 300, 000 cars and 350, 000 engines. It turned out 230,443 unit of cars in 1997, holding more than 50 per cent of the total car market in China.

4.5 Profile of Beijing Jeep

Beijing Jeep Corporation Limited (BJC) was established on 5th May 1983. It is a joint venture between Beijing Automotive Works (BAW), part of Beijing Automotive Industrial Corporation, and American Motor Corporation (AMC), formerly controlled by the French Renault Group (which was acquired later by the Chrysler Motor Corporation (CMC) in August 1987). The registered capital was US$51.03 million, with the Chinese partner investing US$6.6 million in cash, the rest in workshop and equipment, holding 68.85% of the total equity; the American side invested US$16 million, of which US$8 million was in cash, the rest in technology, management skills and other intellectual property rights, holding 31.15%. Total investment amounts to US$152.33 million. The duration of this joint venture was set as 20 years, i.e., until 2004.

Table 4-7: The key entries in Beijing Jeep's chronology

1984	Beijing Jeep began operations on 15th January in Beijing, and was the first joint venture in China's automotive industry.
1985	The new production line of Cherokee XJ was introduced.
1985	The first Cherokee Jeep was assembled on 26th September in Beijing Jeep.
1986	"Beijing Jeep Incident".
1989	Equity percentage adjustment: Chinese partner decreased its share from 68.85 per cent to 61.5 per cent; the American partner increased its share from 31.15 per cent to 38.5 per cent.
1994	Equity percentage readjustment: Chinese partner decreased its share from 61.5 per cent to 57.6 per cent; the American partner increased its share from 38.5 per cent to 42.4 per cent.
1994	the localisation rate reached 80.4 per cent, and the firm began enjoying tariff exemption on its components import from overseas.

Since its establishment, a significant flow of technologies took place from the American side to Beijing Jeep. The transferred technologies mainly include:

- The XJ series of American Motor Corporation (AMC) based on dynamic (continuous) transfer until 2008 (i.e., AMC will transfer any new development of the same line of products to BJC), including the technologies of product design, testing, manufacturing and quality control. This is the only one of the joint ventures in China's automotive industry in which the foreign partner agreed to contribute its current and future technology (insofar as it relates to the same line of products) as its main contribution to the total investment (The American partner also contributed US$ 8 million cash to the new joint venture).
- Production processes: 105 sets of production equipment (covering assembling, welding, painting and testing) were introduced from various countries (engine production equipment from the UK, Italy and Germany, moulding equipment from Japan, painting equipment from the UK, others from the USA), which were supported by more than 3000 sets of equipment made locally.
- Computer-based project management techniques, yearly product innovation management processes, manufacturing engineering designing.
- Technical information management based on microfilm and use of computers.

So, the technologies transferred from American Motor Corporation (AMC), and then Chrysler Motor Corporation (CMC), to Beijing Jeep, includes those relating to the product, production processes, R&D techniques, and information management based

on computers. It is worth noting here that many technologies in relation to production processes were obtained not only from the American side, but also from the UK, Italy, Germany and Japan, to help ensure technical advancement in the production line of this joint venture.

In order to fully assimilate these technologies, Beijing Jeep has taken effective measures such as intensive training, team-building (including technical teams and management teams, where local employees can learn from foreign expatriates directly), vigorous recruiting practices and increasing investment in R&D facilities. Indeed, the assimilation of the transferred technologies in Beijing Jeep has been integrated into the following processes:

1. Raising localisation rate. Every American general manager of Beijing Jeep averred that the success of localisation wholly depended on the technological capacity of local suppliers. So, the success of Beijing Jeep has been largely linked to the capability of local suppliers. The total components of the XJ series are 2364 (Zhang, 1995: 33), of which 1479 need to be supplied by local component producers. In order to raise the localisation rate of the Cherokee XJ series, Beijing Jeep has taken the following measures:

- Setting up the Beijing Jeep Localisation Community, including 136 components suppliers, which is supervised by the Beijing Jeep Localisation Committee joined by managers for the two sides of the firm;
- A clear strategy of localisation with a clear implementation plan of localising most of the 2364 components of Cherokee XJ series;

- The Division of Localisation and Coordination was set up in 1986, charged with the responsibility of implementing the localisation strategy step by step;
- Setting up a new management system in the process of localisation, based on project management and contract system with clear reward or fine provisions.

2. Vigorous quality control. The quality control system in Beijing Jeep includes: quality control in the production process (including quality control of the components supplied by local manufacturers), quality testing of the product, quality reporting and the information dissemination system. Once Beijing Jeep was established, the quality policy and quality management system was taken (or copied) wholly and directly from AMC (later on CMC) and applied in the operations of Beijing Jeep. Extensive training programmes have been arranged to ensure that each of the employees of this firm has been equipped with the sense and skills of quality control. The management team claims that quality control is not only the business of the Department of Quality Control, but also the responsibility of everyone of this firm. The Department of Quality Control only works as a coordinator in implementing the quality strategy of the firm, carrying out the quality education and training, making detailed quality policy, e.g., "Quality Policy of Locally Produced Components", and so on.

A fundamental philosophy behind the quality control system in Beijing Jeep is that high quality can only be achieved through quality assurance in each step of production, not a result of testing the final product. Therefore, a comprehensive quality system was established in Beijing Jeep after its birth consisting of: (1)

commitment of the management team, e.g., setting up a quality control committee; (2) setting up quality control teams in every section of the firm; (3) extensive training programmes on quality control; (4) the dissemination of information on quality control; (5) cooperation on quality control; (6) cross-examination of quality. Regarding the quality control of components, apart from the specific policy towards local suppliers, Beijing Jeep has applied the "Quality Handbook" developed by CMC in its entirety.

3. The upgrading of old product. Beijing Jeep not only produces the Cherokee XJ series, but also produces the BJ212, the old product of the Beijing Automotive Works. The upgrading of BJ212 naturally becomes part of the task of the newly established joint venture, which is the best way of demonstrating the successfulness of Beijing Jeep's assimilation of the transferred technology. BJ212L was the first product based on the further transfer and utilisation of technology and management skills initially transferred from AMC (and then CMC). This marked the ending of an era of no serious innovations in the BJ212 series for twenty years. This comprised 26 innovations and the upgrading of 385 components concerning areas of braking system, noise reduction, and emission reduction. BJ212N was marketed in China in 1989, and embodied 28 innovations compared with the BJ212L.

Table 4-8: The production volume of the main products of Beijing Jeep, 1984-1997

	Total production volume (unit)			Total sales (unit)		
Year	Total	BJ2020①	BJ2021②	Total	BJ2020	BJ2021
1984	16418	16418	0	16384	16384	0
1985	21262	21000	262	20909	20685	224
1986	24087	22555	1532	24384	22826	1558
1987	26705	23703	3002	26688	23704	2984
1988	31002	26502	4500	31076	26551	4525
1989	39130	32500	6630	39153	32528	6625
1990	41832	34332	7500	41840	34330	7510
1991	48230	35530	12700	48209	35523	12686
1992	56245	36244	20001	55683	36248	19435
1993	47130	33321	13809	46604	33297	13307
1994	60907	46204	14703	60219	46233	13986
1995	80151	55024	25127	80457	54536	25921
1996	71333	45282	26051	70851	45122	25729
1997	50191	30814	19377	50103	30713	19390

① BJ2020: the original product of Beijing Automotive Works, BJ212. This has become part of Beijing Jeep's business from the date of its establishment its establishment.
② BJ2021: i.e., Cherokee XJ series.
Source: Beijing Jeep internal statistics, 1998.

4.6 Summary

This chapter has provided a picture for each of the four firms used in this research, i.e., Shanghai Bell and Motorola in China's telecommunications manufacturing industry, and Shanghai VW and Beijing Jeep in China's automotive industry. Issues such as when these firms were established, what technologies were transferred, and

how the technologies were assimilated, were analysed in the context of their development within the Chinese business environment. It is evidenced that progresses have been made in terms of transferring technologies from western parents to these Chinese affiliates, enabling them becoming competitive players in the two industries concerned. However, huge gap still remains between them and their foreign parents in terms of technical and managerial capability, which indicates the great challenge in managing knowledge transfer in transitional markets.

Chapter 5 Methodology

5.1 Introduction

In order to achieve the objectives set out in Chapter 1, a sound and coherent research methodology must be identified. This chapter explained the reason for choosing a multiple-case study methodology, based on cross comparative analysis, and the process of implementing it in this exploratory research, notably during data collection and data analysis. It showed that this research was conducted based on the prior development of a questionnaire (used for examining the four research questions set out in Chapter 1) to guide data collection and analysis, and relied on different sources of evidence from multiple stages of research, with data collected and processed in a triangulating fashion. Thereby, the finding of this research was placed on a solid basis in terms of validity and reliability.

5.2 Research methodology and the research process

A multiple-case study design, based on cross comparative analysis, was chosen in order to carry out a detailed, but also relatively comprehensive, investigation of the processes of knowledge transfer and organisational learning of several MNCs operating in multiple sites in both the Chinese telecommunications manufacturing industry and automotive industry. It is argued that the objective of the research could not be achieved by employing a different methodology, such as the survey method.

As explained by Yin (1994: 1), "Case studies are the preferred strategy when 'how' or 'why' questions are being posed, when the investigation has little control over events, and when the focus is on a contemporary phenomenon within some real-life context". The purpose of this research is to explore the process of knowledge transfer and organisational learning through FDI in the Chinese market, with the research questions being centred on the "what", "how" and "why" of knowledge transfer in this transitional market. In particular, what knowledge has been transferred by the MNCs into the Chinese market? how has the knowledge been transferred? how has the transferred knowledge been utilised? And, what are the impacts of the Chinese business environment on MNCs' knowledge transfer and organisational learning? Owning to the lack of research in this subject area, and the fact that researcher has no power to manipulate the behaviour of the subjects (employees of both the parents and affiliates) within the on-going event (i.e., knowledge transfer and organisational learning), the case study approach was selected as the best. This approach allows the in-depth analysis of the complicated issues involved in the research topic. In short, the case study methodology enabled this research to tackle the "meat" (details) of the process of knowledge transfer and organisational learning carried out by FDI in the Chinese market. Given that this research is not a study that tests or repeats earlier work, and, as noted earlier, there is little existing research, the case study method is the logical choice to explore the chosen topic.

This research has chosen a multiple-case design. As described by Yin (1994: 44), multiple-case design contains more than one single case of analysis in the same

investigation, and thereby permits a comparison across cases. The reason for choosing a multiple-case design instead of a single case design is because the former has distinct advantages in comparison with single-case designs. The evidence from multiple cases is often considered more compelling, and the overall study is therefore regarded as being more robust (Herriott & Firestone, 1983). In the course of carrying out multiple-case research, each case must be carefully selected so that it either (a) predicts similar results or (b) produces contrasting results but for predictable reasons (Yin, 1994: 46). This suggests that cases should be selected for aspects in common or in contrast, for which we are able to predict the outcomes.

In this research, two cases have been chosen from each of two industries, China's telecommunications manufacturing industry and its automotive industry, making the total number of cases up to four. The reason why these four firms were selected from the nine firms in the first round of investigations, is that: (1) Being final assemblers, they have engaged in more extensive knowledge transfer than component suppliers; (2) Being at the top of the FDI league table (see "Table 3-3: Leading MNCs in China, 1995-1996" in Chapter 3 for details), they were considered to be of large size and therefore more suitable for comparative analysis than others; (3) Choosing equal number of firms from the USA (Motorola and Beijing Jeep) and Europe (Shanghai VW and Shanghai Bell) will better enable comparison of the business practices on knowledge transfer and organisational learning between firms of different national origin. Therefore, the research covers the western countries from which most FDI in China has been drawn. Hence, these four firms are deemed to be the most suitable for this research.

Multiple-case research is, in essence, also a process of cross-comparative analysis. According to Warwick and Osherson (1973: 8), comparative method refers to social scientific analyses involving observations in more than one social system, or in the same social system at more than one point in time. Comparative analysis performs at least one of four functions: replicating earlier evidence to check out whether it was correct; to establish the generality of a fact; verifying existing theory and generating new theory (Glaser and Strauss, 1967: 23). Moreover, a synthetic comparative research must be both holistic – so that the cases themselves are not lost in the research – and analytic – so that more than a few cases can be comprehended and modest generalisation is possible (Ragin, 1989: xiv).

In this research, both China's telecommunications manufacturing industry and automotive industry are chosen as the final sectors for our case study. There are many similarities between these two industries, but there are also crucial differences rendering them excellent case study materials for scientific enquiry. In terms of similarities, both are large-scale foreign direct invested industries in which extensive knowledge transfers have been reported. In respect of their differences, these largely arise in the technology intensity of production and their human capital intensity. The telecommunications manufacturing industry is at the forefront of advanced technology[29], and the cutting edge technologies are the basis for creating firm

[29] Advanced' or 'high' technology normally refers to that which is relatively new and represents the application of recent research and development. 'Low technology', by contrast, refers to older, more mature technologies, arising from research and development carried out some time ago. There is often (but not always) an association between the level of technology and its factor-intensity. Advanced technology, arising from recent research and development in high wage economies, is often associated with relatively capital-intensive manufacturing process, while older technology is often relatively more labour-intensive (Child and Lu, 1996).

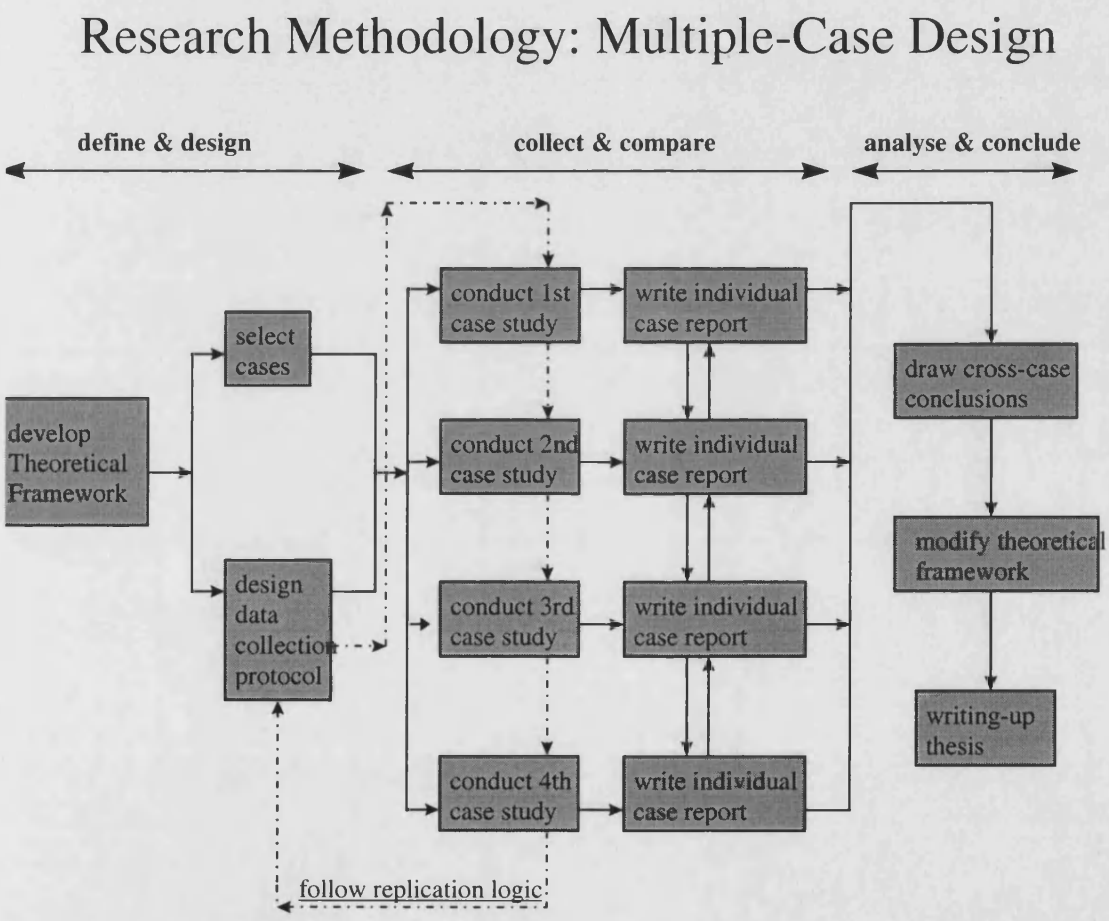
competitiveness. The automotive industry, on the other hand, is less technologically intensive, relying on modest technologies and large-scale production to reduce average cost and maintain competitive edge over rivals.

In the process of this research, paired comparisons were made to explore the commonalties and differences in knowledge transfer practices between not only the telecommunications and the automotive industry, but also the joint ventures and the wholly-owned subsidiary, and American investments and European investments. A replication logic has been applied throughout the process of data collection and data analysis (as described in the Section "5.31 Selection of the research site", in the paragraph starting with "This research has carefully selected ...") to establish the validness of the new findings. In conducting the comparative analysis, special attention was paid to both conceptual equivalence and linguistic equivalence, referred to by Glaser and Strauss (1967: 11), to achieve relatively valid result. It has been proved that choosing such a multiple-case design based on comparative analysis has proved to be the cornerstone of the soundness of the quality of this research.

The research went through several phases of data collection. Phase 1 might be termed the "defining and designing" phase. Some grasp was gained on the progress of research in relevant subjects and we identified which was salient. Then the data collection protocols were designed. Phase 2 can be termed the phase of "collecting and comparing". We conducted several field investigations (two in China and one in Belgium) and worked on the research problems extensively. Phase 3 may be termed

the "analysing and concluding" phase. We analysed the data collected and checked the findings in accordance with the procedures of judging the research quality given by Yin (1994: 33). After further theoretical refining, the whole research became the basis of this thesis. The research methodology employed in this study can be shown as below:

Figure 5-1: Research methodology: Multiple-case design



5.3 Data collection

5.31 Selection of the research site

As most of the world major telecommunications equipment manufacturers and automotive producers have become involved in the Chinese market (Wu, 1995: 11; Anderson Consulting, 1997), the availability of research cases is not in question. In identifying potential research candidates, the following criteria were developed. Apart from the entry mode chosen (either joint venture or wholly-owned subsidiary) and industry engaged (either automotive or telecommunications manufacturing sector), MNCs had to have been operating in China for a period of at least five years. The five-year criterion was deemed necessary in that the selected firms would have at least one key technology transferred and utilised, and the overall performance results of the transfer(s) could be scientifically assessed then without the contaminating impact due to start-up, enabling analysis of the complex adjustment process in transferring knowledge and its impact across the organisation. This also provided a basis for comparison analysis among multiple cases. The five-year criterion is a little longer than that established in previous research on knowledge transfer and organisational learning, e.g., Inkpen (1995b: 129) and Lyles and Salk (1996: 887). The aim is to exclude any period of time that was not used in knowledge transfer and organisational learning in the firms concerned, for example, business license application, which took about 3-6 months in Beijing Jeep and Shanghai Bell (according to the respective annual reports of these two firms).

Thirty-nine companies meeting the above criteria, roughly half to half in the two industries targeted in this research, were contacted in order to seek permission for an in-depth cases study of their experiences of handling knowledge transfer in the Chinese telecommunications manufacturing industry or automotive industry. Upon receiving the positive responses from twelve firms, nine of them were selected for fieldwork after a thorough review of the newly received company-related documents (The other three were eliminated because they were either too small or only able to provide us access far different from the date of our scheduled field work. Please see Appendix I for a profile of the interviews conducted). Based on the results of the first fieldwork, four firms, which equally represented the industries (telecommunications and automotive) and the FDI source regions (EU and US), as shown below, were identified as the cases for further research (the reason why these four firms were chosen has been explained in the paragraph starting with "In this research, two firms ..." in Section "5.2 Research methodology and the research process" and also in the footnote on page 148).

Table 5-1: The origin and industry representation of the researched firms

	Telecom	**Automotive**
EU	Shanghai Bell	Shanghai VW
US	Motorola	Beijing Jeep

Given the restrictions faced by the researcher, such as time, and especially financial resources, this is the maximum number of cases which can be handled using the chosen means of exploration (Ragin, 1989: xiii). The question here is: Can findings based on only four cases be generalisable in a wider context? This is an issue of considerable pertinence to this thesis and we believe it appropriate to address it directly.

Findings from multiple-case research can be generalisable to a wider context. However, the logic behind the generalisation of the findings from multiple-case research is different from quantitative research. Yin (1994: 31) points out that "A fatal flaw in doing case studies is to conceive of statistical generalisation as the method of generalising the results of the case". The case study approach does not aim to 'represent' a 'sample' (*ibid.*, p. 10), hence the rules for examining case study should be different from those of sampling-based survey research. The relevant method of generalising the findings is called "analytical generalisation". Yin (ibid., 10) argues that "Cases are not 'sampling units' and should not be chosen for this reason. Rather, individual case studies are to be selected as a laboratory investigator selects the topic of a new experiment. Under these circumstances, the method of generalisation is 'analytic generalisation', in which a previously developed theory is used as a template with which to compare the empirical results of the case study. If two or more cases are shown to support the same theory, replication may be claimed" (ibid., 31). "Once such replication has been made, the results might be accepted for a much larger number of [cases]" (*ibid.*, 35). The above discussion

clearly indicates that findings based on multiple-case research, if underpinned by replication, can be generalisable.

This research has carefully selected the four firms[30] and put replication at the centre of the process of data collection and data analysis. Based on the questionnaire developed from the present theoretical framework (which was tested and refined in the preliminary field investigations, as described in the paragraph starting with "Thirty-nine companies meeting ..." of this section), a detailed investigation was first launched in Shanghai Bell, then a replication approach was employed to test the validity of the findings in Shanghai VW, Beijing Jeep and Motorola (China). Any differences emerging between two cases were then examined in the other two. It was also possible to examine Alcatel Bell, the foreign parent of Shanghai Bell. Research findings as a result of such a deliberate process are solid in their validity, and are thought to be much more reliable in future applications (Yin, 1994).

[30] The correct procedure in case study research is that "Each case must be carefully selected so that it either (a) predicts similar results or (b) produce contrasting results but for predictable reasons" (Yin, ibid., 46). As discussed on page 141, in this research we have selected four cases (being the financially manageable number) for similarity in terms of two from each industry, and two from the USA and two from Europe. In addition to the reasoning given on page 141 (in the paragraph starting with "In this research, two cases have been chosen from each ..."), we are able to justify in theoretical terms the selection of the four firms from the perspective of international business. In respect of industry, relatively speaking, both the telecommunications manufacturing industry and the automotive industry are knowledge intensive (even though there are obvious differences between them). According to the theory of international business, research and knowledge-intensive firms are likely to wish to maintain appropriability over their intellectual assets, either through ownership strategy or through effective internal organisation to reduce dissipation (Harrigan, 1985). Our four cases can therefore be seen to seek similarities in respects where these are expected, on the basis of received theory. In respect of the size of the chosen cases, at present there is no relevant theoretical body of work to assist in predicting the outcome of joint venture partner-size effects in a developing country. Consequently, choosing firms of significantly different scale in the list of inward investors in China would mean introducing a possible source of contrast for which we had no theoretical prediction, and it is likely that the confidence in some aspects of our existing findings would have been sacrificed. Therefore, the four foreign invested firms (all in large size) were selected for their similarity in this respect.

Even so, we acknowledge that it is still a weakness of this research that it comprises only four cases examined in detail. The limited resources for this research has meant that some aspects of generalisability would inevitably be lost, whatever combination of four firms was chosen. In our research the reliance on very large affiliates in the Chinese market clearly suggests that generalisability may well be limited to other very large foreign invested firms. The findings of this research would have been more solid and more ready for future application in other industries in the Chinese market and in other transitional markets had more cases of different sizes been included.

5.32 Data collection process

This research included two phases of data collection. The objective of this first phase was to obtain sufficient information on what is important enough to follow up in detail, and prepare for the field investigation. Initially, a good deal of knowledge about MNCs' knowledge transfer in general, and their practices in the Chinese telecommunications manufacturing industry and automotive industry in particular, was gleaned through a review of the relevant literature available and the study of archival documents, such as annual reports, newsletters, strategic plan reports and press articles. The firms that qualified for fieldwork were then identified and contacted. Several data collection protocols to be used in future fieldwork were designed according to the theoretical framework derived from the relevant literature survey, with some contingent plan prepared.

In Phase 2, two rounds of in-depth interviews were carried out. Sufficient time was allowed between Phase 1 and 2 for Phase 1 data to be thoroughly analysed and for more structured protocols (for interview) to be built accordingly. Then, during Phase 2, these protocols were used in obtaining information in depth about those elements determined to be salient.

After further study of the chosen firms, a first round investigation was carried out in nine firms of both the telecommunications manufacturing industry (four firms) and the automotive industry (five firms) in China (a full name list of the firms and interviewees has been attached in the form of Appendix I). This round investigation was intended, via a mixture of open-ended interviews and semi-structured interviews (most of them were in-depth ones), to thoroughly examine the key issues identified in the previous study and gain a deep understanding of the inter-relationship among them. It also sought to establish a complete list of factors which would be essential in handling the MNCs' knowledge transfer in the Chinese market. During the first round investigation (20th May to 31st July 1997), a mixture of both open-ended and semi-structured in-depth interviews were conducted. For example, the interviewees were asked several grand tour questions first, following which their answers on some pre-determined questions were sought based on the understanding of the researcher himself. Each part lasted around half an hour, making every interview at least one hour in total (There were several occasions when the interviews were less than one hour due to various reasons, such as the inability of the interviewees to explain their points deeply, time restrictions when the interviewees were on duty, unexpected interruptions and so on). There were at most two interviews a day and three

interview days a week. One-day breaks (sometimes longer depending on interviewee's availability) were arranged between interview days, allowing enough time for data categorisation and recording.

Between August 1997 and February 1998, We had been immersing ourselves in transcribing the data collected from the 24 interviews conducted in China and analysing other relevant information in relation to the knowledge transfer activities of those firms concerned. Mail communications with the interview participants were maintained to help the researcher further understand those points that had not been enough pursued, and suggestions were sought from both academics and practitioners on the next stage research. Preliminary findings were developed and, at the same time, certain gaps were also identified for further investigation. These formed the basis of designing the amended research questions for the second fieldwork.

Before the second field visit to China, on 18th-21st February 1998, I travelled to Antwerp, Belgium, interviewing managers at the headquarters of Alcatel Bell, which is Shanghai Bell's foreign parent (a profile of the interviewees is attached in Appendix II). This trip was to gather the European perspective, and to improve the scientific validity of our findings from China. This field visit[31] provided a good chance for me to review the knowledge transfer process between Alcatel Bell and Shanghai Bell, and developed a more comprehensive and correct understanding of knowledge transfer within MNC. This served as a benchmark to examine the practices of knowledge transfer in the other three firms chosen for the second stage

[31] I was accompanied by my supervisor Dr Clegg in this field visit.

investigation, and to compare the commonalties and differences in knowledge management in the two industries concerned, and to explore the internal and environmental reasons for those different practices which were identified.

Based on the research carried out in the first two and half years of this Ph.D research and a refined questionnaire, the second field trip was much more focused. Four of the nine firms previously visited were chosen for the final investigation. Again, a mixture of open-ended and semi-structured in-depth interviews were carried out to fill in the gaps found in the previous investigation, deepen our understanding on MNCs' knowledge transfer process in the two industries concerned in China, and compare the differences in knowledge transfer practices among these firms (i.e., the triangulation of the findings). In doing so, a benchmarking technique was employed to ensure the cross comparative analysis, validate and polish the findings of the first round, and build up a more solid interpretation on the research topic. The findings were taken back to the site and subjected to the scrutiny of the people who had provided information. The task was to obtain confirmation that the report had captured the data as constructed by the informants, or to correct, amend, or extend it, that is, to establish the credibility of the case.

In total thirteen interviews were conducted, i.e., Motorola, 2; Shanghai Volkswagen, 7; Beijing Jeep, 4 (Please see Appendix III for a profile of the interviews conducted). Each interview session lasted one to two hours.

The participants in the field investigations, as shown in the appendixes at the end of this thesis, were employees of the selected firms located in various bases in China, but predominantly concentrated in Shanghai and Beijing. They included: president, vice-president for R&D, executives of various functional divisions, such as business planning, marketing, finance, production and human resources. Other members of the knowledge transfer team, such as the training manager, operational manager, project engineer and other technical professionals, were also interviewed when possible. Participation in the interviews was totally voluntary. The anonymity of respondents and the confidentiality of their responses, when requested, were assured.

When possible, interviews were conducted by two interviewers, recorded and content-analysed, i.e., interviews in Alcatel Bell's headquarters in Antwerp, Belgium. However, the interviews conducted in China were carried out by myself with the help of a mini-recorder. The benefit of two interviewers proved to be important for thorough note taking, for asking the best follow-up questions, and for subsequent synthesis and analysis. If the interviews were not allowed to be recorded, as with some of the cases in China, note-taking was carried out and the interview would last intentionally longer in order to make more time available for closing the gaps found in the interview process. Attention was paid to avoiding interview bias. It is well known that data collected by a single interviewer can be very imprecise if interview bias is not properly identified (Huber and Power, 1985: 172). In order to address this I attended research seminars on methodology training, and conducted detailed preparation before each interview. The avoidance of bias was effected through the careful handling of probing in the process of interviewing, treating

respondents equally and objectively regardless of their positions as managers or engineers, Chinese or foreign expatriates, and through triangulating the data retrospectively by seeking to interview more than one person in each unit of analysis. These measures, proposed by Jackson (1995), Easterby-Smith (1991) and Hyman (1954), were proved to be worthwhile in guarding against interview bias emerging in the various interview situations of this investigation.

Before the actual interview took place, special efforts had been made to ensure the questionnaire used was accurate and clear. This was mainly to do with avoiding questionnaire-wording problems. I carefully selected the questions to be asked, drafting them in very clear language, which was then re-examined by my supervisors. When interviews took place, the main questionnaire was refined after each interview session, prohibiting repetition of any possible errors. As my interviewees were composed of both Chinese and foreign expatriates, the English version of the questionnaire was carefully translated into Chinese, and back translation suggested by Brislin (1970) was carried out to seek the content consistency between them.

The working language of interviewing, understandably, was both English and Mandarin Chinese. The Chinese version of the transcripts were also translated into English using the back-translation method to ensure conceptual equivalence.

5.33 Data recording and transcribing

Interview data and field notes were recorded by using the 'critical incident' approach suggested by Erlandson *et al* (1993: 103). This first involved recording significant and meaningful data in descriptive terms that was as specific as possible. It also involved structuring the data collected to address the research questions identified and to focus efforts on emerging themes. The documentation of the data in this way did facilitate the data analysis. Moreover, suggestions on data recording discussed below were also consulted to ensure the quality of the recorded data.

How many interviews need to be transcribed? It seems that it would be always better to transcribe every interview conducted in the whole research process. However, according to Strauss and Corbin (1990: 30-31), the actual transcription should be selective. The general rule of the thumb here is to transcribe only as much as is needed. The very first interviews or field notes should be entirely transcribed and analysed before going on to the next interviews or field observations. This early coding gives guidance to the next field observations or interviews, or both. Later, as the research questions develop, one may wish to listen to the tapes and transcribe only those sentences, passages, or paragraphs that relate to one's evolving propositions or theoretical predictions. They emphasise that, especially near the end of your study when your analysis tells you there is a hole in your theoretical formulations that needs closing and that further data collection is needed to close it, then, you may want to transcribe only those portions of the interviews or field notes that pertain to the theoretical gap that sent you back into the field.

Therefore, given the fact that a detailed framework on the process of transferring knowledge within nine MNCs was developed as a result of twenty-seven interviews (twenty-three of them are in-depth ones) in China, and a big interview participated by five managers in Alcatel Bell, there is no need to fully transcribe all the interviews conducted in the second field trip to China. Only those substantially contributing to our understanding on issues of this research should be mostly transcribed. The rest could be selectively transcribed according to their importance to the research questions. Based on the above understanding, the taped interviews of the first round investigation were mostly transcribed verbatim, but then notes were taken or only important parts were transcribed later on those of second round interviews. These transcriptions were then being analysed according to the themes identified in the aforementioned stages of investigation and answers to specific questions were tabulated. This has been further explained in the next section.

5.4 Data analysis

The data analysis in this research has closely followed the procedures set for interpreting qualitative data (Easterby-Smith, *et al,* 1991; Marshall, 1996; Strauss, 1987; Creswell, 1994) in general, and case study methodology (Yin, 1994) in particular, to pursue a high-quality result. Moreover, data analysis was not conducted only following data collection and preceding report writing. Data analysis began with the very first data collection, in order to facilitate the emergent design, grounding of theory, and emergent structure of later data collection phases (Lincoln

and Guba, 1986: 241). We considered data analysis as an ongoing activity throughout all phases, as increased awareness and understanding of the knowledge transfer issues would facilitate the development of a conceptual framework.

The interviews were analysed individually, across teams of different sites within the companies, to identify factors contributing to successful and unsuccessful performance of knowledge transfer and organisational learning. Subsequent data analysis focused around the managerial dimensions in the process of executing the knowledge transfer and organisational learning, and involved an emergent process in constructing grounded interpretations. Case writing-ups were available for circulation among leading participants to verify overall accuracy, a step recommended by Yin (1994). It was hoped that by this way would we be provided with additional information to help fill in potential missing areas.

Moreover, in order to gain genuine, holistic results from the investigation, some significant overlaps were placed among the investigation phases. First of all, as soon as even one interview was obtained in Phase 2, or some other informational sources were drawn on, data analysis began and some initial very provisional insights were formed. These were continuously pursued to ensure that subsequent informants or sources were also provided the opportunity to provide "stream of consciousness" inputs. The development of a report following the first round in-depth interviews uncovered certain information gaps that could be filled during the second round investigation of Phase 2. The member checks process between Phase 2 and Phase 3

was also carried out during the other phases, for example, by checking information from one respondent with another (i.e., cross referencing and cross checking).

By the end of this process, we finally had a comprehensive account on the selected firms in its approach to promote the firm competitiveness by transferring knowledge to their affiliates in China's telecommunications and automotive manufacturing industries.

5.5 Justification of the research finding

It remains controversial on how to judge the validity and reliability of the qualitative type research findings. Strauss and Gorbin (1990: 249) argue that a qualitative study can be evaluated accurately only if its procedures are sufficiently explicit so that readers of the resulting publication can assess their appropriateness. Also, the scientific canons (research standards) that the researcher has assumed should be appropriate to the study. Yin (1994: 330) further supposes that any qualitative research based on case study designs should be judged from research design stage to the very end of data analysis, i.e., the whole research process rather than some parts of it must be examined to establish the quality of any empirical research finding. In this research, every effort has been made to ensure the soundness of research finding in terms of validity and reliability required by case study methodology (Yin, 1994: 33) and qualitative research (Lincoln and Guba, 1986: 43; Strauss and Gorbin, 1990: 249), respectively.

First, construct validity was addressed by way of prolonged engagement, triangulation and member checks. By 'prolonged engagement', we mean that when the research design was finished, sufficient time was invested to learn the history and culture of the chosen firms in order to clearly know "them". At the same time, many efforts were made to get rid of the misinformation introduced by respondents and build up trust with respondents in the firms chosen (in this case, affiliates of the nine MNCs in the first round investigation, from which the four selected MNCs were further researched in the second round investigation), and those in the parent MNC (i.e., Alcatel Bell). By 'triangulation', we mean the use of different methods to validate the gained data. It has been pursued throughout this research. Firstly, triangulation was conducted when all the data collected from the secondary sources prior to the first fieldwork were checked using whatever the first hand information from the companies visited was available. Indeed, the typical questions asked at the beginning of each interview (after explaining the background of the research and the purpose of the interviews) were to seek confirmation from the interviewees that the data we held were still valid. If not, what were the changes and why did they happen. Secondly, triangulation also took place between: (1) the first round of interviews (May to July 1997) and the second round of interviews (June to July 1998); (2) interviewees of the same company, for example, asking Mr Zheng, the production manager of Shanghai Bell, to comment on the description of the knowledge transfer route and the knowledge transfer process contained in the interview with Ms Yin, Director of the office of Board of Directors in this firm; (3) and interviewees of different companies within the same industry, for example, some of the insights about Shanghai VW's approach of selecting local suppliers were obtained first from

an interviewee in First Auto Works, one of the nine firms visited in the first fieldwork, and then checked upon when an interview was later conducted with Mr Wolfgang Rohroff, senior adviser and director of supply department in Shanghai VW. Thirdly, triangulation was also carried out by collecting the most recent publicly available data, e.g., latest statistics, newspaper articles, news release and annul report, etc., to update and validate the existing ones. And finally, by 'member checks', we mean all kinds of data, such as analytic categories, interpretations and conclusions, were tested "with members of those stake holding groups from whom the data were originally collected" (Lincoln and Guba, 1986: 314). In this respect, after the data were collected and subjected to preliminary analysis, they were sent to the following people to check the accuracy of the data: Ms Yin Linggu and Mr Zheng Yulu of Shanghai Bell, Mr Cheng Gang and Mr Sun Changsheng of Shanghai VW, Mr Liu Hui (Lee Liu) and Mr Boris Wang of Motorola (China), Ms Sun Ying and Mr Tong Zhiyuan of Beijing Jeep. The data were also sent to the following interviewees of Alcatel Bell for comments and validation: Mr Jos Caerts, Mr ir. Marc De Koker, Mr Hubert Van Potelberghe, and Mr Jef Jacobs (please see Appendix I and III for the individual profile of these people). Moreover, as the analysis proceeded, further contacts were made with relevant interviewees to seek information or clarifications on issues which had been ignored in the fieldwork, or validate new data which were found to be different from what we had.

Second, internal validity was addressed by pattern matching, recommended by Yin (1994: 33). Pattern matching indicates the logic of comparing an empirically based finding with a relevant one developed in the research proposal. If they coincide, the

results can help a case study strengthen its internal validity. This technique was used as the backbone for developing theoretical issues and validating findings within this research: a research proposal, with concrete research questions derived from the literature review and extensive discussions, was designed in the first year of this Ph.D research, and assessed by the formal Ph.D upgrade panel in February 1997. This formed the basis for the two-stage fieldwork. Each of the research questions was explored in the investigation of those firms one by one, and an evolving process of developing those solidly established into points of the theoretical building up of this research was pursued in each of the research phases. The application of benchmarking in the second fieldwork based on a comparative analysis, and the exploration of the commonalties and differences of knowledge transfer practices among the chosen firms during that process, further strengthened the internal validity of this research.

Third, external validity was addressed by way of using replication logic in this multiple case study. Replication was not only carried out in the second round investigation where four firms were further examined based on the findings gained from previous investigation, but also applied from the very beginning when every element of the findings was established (The process of conducting replication in this research has been described in Section "5.31 Selection of the research site", in the paragraph starting with "This research has carefully selected the four firms and put replication ..."). This spiral replication approach ensured that findings from one corner of the investigation was repeatedly examined in the rest of the research, therefore, allowing any false findings to be removed before the final version.

Fourth, reliability was addressed by using a series of evolving case study protocols and developing a database for this multiple case study in the data collection process. The case study protocols were first developed during February and March 1997, after the research design was approved by the Ph.D upgrade panel. They included questionnaires (open-ended and semi-structured), standard letters to companies, interview strategies, etc. Based on the continuous refinement of the research protocols in accordance with the changes indicated from the consultations with the chosen firms in the data collection process (pilot study and first field work in 1997, and second field work in 1998), mistakes in the course of the data collection and analysis were thus minimised. The data base developed for this research included raw data collected, such as interview transcripts, company annual reports, relevant books and newspaper articles, company statistics and technical materials, etc.; data analysis materials, such as inquiry proposals, personal research notes, write-ups of field notes, summaries and important references; methodological notes, such as procedures, designs, strategies, rationale; findings, conclusions and stage reports. This created a chain of evidence and thinking driving the whole research, which can serve as a launch pad for the research findings to be applied elsewhere.

Chapter 6 Knowledge transfer by FDI in China's telecommunications manufacturing industry and automotive industry

6.1 Introduction

The objective of this chapter is to address the first two research questions set out for this research, i.e., what knowledge has been transferred through FDI from MNCs' headquarters to their affiliates in China's telecommunications manufacturing industry and automotive industry, and how has the knowledge been transferred? Before examining them we first shed some light on the situation in these affiliates prior to knowledge transfer, which will affect the knowledge transfer practices employed by the firms concerned. Then we explore the typology of the transferred knowledge, the stage characteristics of the transferred knowledge and the way of managing knowledge transfer. This chapter also sets the stage for analysing the process of utilising the transferred knowledge in the recipient firms, that is, inherent in the organisational learning process. Knowledge utilisation has been regarded as part of the whole knowledge transfer process and, represents a continuation of the issues addressed in this chapter.

6.2 The context prior to knowledge transfer

6.21 The strategic motives of MNCs in entering the Chinese market

In the introduction to Chapter 3, we have seen that since the end of the 1970s FDI has continuously increased in the Chinese economy. Early investments made by Hong Kong and other overseas Chinese into China's coastal areas, notably those in Canton Province, where processing industries are the mainstay of inward investment, were established mainly with the intention of utilising cheap labour. Later investments made by firms of the Triad (US, EU and Japan) have been much wider in terms of motives, following the changes in Chinese government policies on FDI in the middle of the 1980s.

As discussed in Chapter 2, there are four main motives of FDI by MNCs in overseas markets, i.e., resource-seeking, market-seeking, efficiency-seeking and strategic asset or capability seeking (Dunning, 1993: 56). Unlike the early investments whose motives were mostly resource seeking, the later investments in the Chinese market are much more diverse in motivation. But, a key characteristic is the emerging dominance of the market-seeking motive. The opening of China's internal market has been the main incentive for MNCs' direct investment in the Chinese economy, especially so in the 1990s. The interview data from the four firms investigated appear to fully support the above expectation.

According to the interviewees, the primary motive for the foreign partners to engage in these four firms is to service the Chinese market. In the case of Shanghai Bell, as explained by the senior managers of the Belgian parent Alcatel Bell during the interview, the motive of the parent to be involved in the Chinese market was market seeking. They explained that, they never thought about turning the joint venture into a base for servicing East Asia and Pacific markets, by using the cheap Chinese labour. These markets were in fact already serviced by either Alcatel Bell itself or its other joint ventures in this area (Alcatel Bell has joint ventures in South Korea, Taiwan and Australia). Labour cost is only a fraction of the whole cost of switching systems, besides, labour cost in China's coastal area is not dirt-cheap any more. It therefore does not make sense to base export on low labour cost, as it makes an insignificant contribution to competitive needs.

> You mentioned the factor of cheap labour. I tell you cheap labour now really has not much attraction to foreign investors, especially in industries like telecommunications. This industry is not labour intensive, but high technology intensive and capital intensive. How much is the percentage of labour cost in the final product? 10 per cent or 15 per cent? Not much! What matters is whether you can recruit and retain the skilled employees, especially engineers who can carry out R&D and application, and reward them with a dear income. Moreover, labour cost in the coastal areas of China is not that cheap any more. In places like Shanghai labour cost has been soaring in recent years. Without a start salary of RMB2000-3000 yuan (US$240-360) per month, plus other numerous benefits, no one will come to work for you. The average salary in Shanghai Bell is something between RMB40,000 to 50,000 yuan per year. In Shenzhen the salary level is even higher.
>
> (Mr Zheng Yulu, Shanghai Bell)

The motivation of market seeking can be further discerned in the parent's success in supplying intermediate products to its joint venture affiliates in China. In the case of Shanghai Bell alone, as shown in the following table, more than US$ 500 million of

intermediate products were imported from Alcatel Bell during 1988-1997. These successfully supported the employment and production in Alcatel Bell in Belgium.

Table 6-1: Alcatel Bell's intermediate products export to Shanghai Bell, 1988-1997 (Unit: Million of US dollars)

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Import from Alcatel	21.6	27.7	27.2	43.5	46.2	69.5	42.3	64.8	103.0	62.9
Shanghai Bell's sales	41.6	66.6	81.9	126.4	229	488.5	610.3	546	551	540
Import/Sales (%)	51.9	41.5	33.2	34.4	20.1	14.2	6.9	11.8	18.7	11.6

Source: Alcatel Bell's internal document (1998), P.III/12, and interview data.

It is evident that Alcatel Bell has used Shanghai Bell as an "aircraft carrier" to help secure the Chinese telecommunications equipment market. Considering seven joint ventures have been set up by this firm in the Chinese market alone, there is no doubt that Alcatel Bell's strategy of servicing the Chinese market is two fold: the first is to invest capital and knowledge assets in establishing equity-based joint ventures; the second is to directly export to these firms.

Motorola, a dominant player in the world electronics industry, also entered China for its huge market. As commented in the interviews by Mr Bill Bowers, the executive vice president of Motorola (China):

> It is the business opportunities that attracted Motorola to take concrete steps in penetrating the Chinese market. Being one of the biggest firms in electronics, we want to go with China.

This has been fulfilled by a huge investment programme (US$2.5 billion by the end of 2000). It also carries with it extensive technology transfer and R&D cooperation, intensive in-house training and localisation activities, and endeavours to promote good corporate citizenship, as explained in the relevant company profile in Chapter 4. Motorola (China) has been successful in establishing itself as one of the market leaders in China's telecommunications manufacturing industry (for example, according to Yu (1997: 119), Motorola occupied 50 per cent of China's mobile phone market and 70 per cent of pager market in 1996). Furthermore, Motorola's benefits in engaging in the Chinese market can also be found in its export of intermediate goods to its Chinese subsidiaries. During 1993-1996, Motorola's plants in America exported "nearly US$ 1 billion of intermediate products to its Chinese subsidiaries, supporting jobs in many states, including Arizona, Florida, Illinois and Texas" (Motorola in China, 1997: 4). Benefits of this nature are clear evidence of Motorola's market seeking motivation in the Chinese market: not only local market servicing via its subsidiaries, but also direct export to these subsidiaries.

The automotive industry is no exception to this pattern. Both Volkswagen (VW) and American Motor Corporation (AMC, later Chrysler Motor Corporation – CMC) all wanted to serve the Chinese market. They have been in China first and foremost to service customers of this highly regulated, but little developed, market. As explained by one senior manager of Shanghai VW, Mr Cheng Gang:

> The aim of VW's investment in China is to be dominant in this huge Chinese market, and then enter South East Asian market. Without a stronghold in Asia, it is very difficult for VW to service this transitional market. Based on the ideal combination of VW's advanced technology and the cheap labour available in China, VW has been very successful in the East Asian market. That is VW's initial strategy.

Mr Zhao Nailin, a vice president of Beijing Jeep in the 1980s, also confirmed the strategic motive of AMC (and later CMC) in entering the Chinese market:

> Their motive is first Chinese market; then (use the Chinese) production base of Chrysler for competing in the Far East. This is the motive of the American side.

Like that in the telecommunications industry, an additional incentive for these two firms to engage in China is the direct export of intermediate goods. Beijing Jeep is another classic example. As Beijing Jeep and its suppliers were unable to achieve a high localisation rate in a short time, a large amount of foreign exchange was needed to import the components from AMC and CMC for the assembly of the Cherokee XJ series (CKD mode). This is shown in the following table.

Table 6-2: Foreign exchange expenditure of Beijing Jeep, 1985-1993

	Production volume (in units)	Forex expenditure (US$10,000)	Forex expenditure on CKD (US$10,000)	Forex expenditure on CKD per unit (US$)
1985	262	1615.4	499.5	19064.89
1986	1532	3102.1	1260.1	8255.20
1987	3002	4659.8	3266.4	10880.75 78
1988	4500	7763	4258.7	9463.
1989	6630	11046.3	6533.1	9853.85
1990	7500	10372.1	6772.2	9029.60
1991	12700	17216.1	11503.8	9058.11
1992	20001	24372.3	17333.6	8666.37
1993	13809	14469.7	10818.6	7834.46

Source: "Beijing Jeep Statistics, 1984-1994", BJC, 1994.

The above table actually indicates the volume of internal trade flows from AMC (and then CMC) to BJC. The contents of these trade flows were components supplied by the American side to BJC. Driven by the increase in the production volume, the foreign exchange expenditure on importing components rose dramatically. Beijing Jeep was unable to export its products in the start-up period to generate enough foreign exchange with which to meet the cost of importing components, as indicated in the export earnings and foreign exchange net spending in the following table. This forced the Chinese government exceptionally to allow Beijing Jeep to sell its products by invoicing Chinese customers in foreign exchange, as a means of easing the situation.

Table 6-3: Foreign exchange earnings and spending of BJC, 1985-1993

	Export volume (in units)	Export earnings (in US$10,000)	Forex expenditure (US$10,000)	Forex net spending (US$10,000)
1985	24	7.2	1615.4	1608.2
1986	494	308.8	3102.1	2793.3
1987	174	131.7	4659.8	4528.1
1988	603	673.51	7763	7089.49
1989	559	545.94	11046.3	10500.36
1990	513	484.57	10372.1	9887.53
1991	241	380.42	17216.1	16835.62
1992	597	820.85	24372.3	23551.45
1993	891	1456.8	14469.7	13012.9

Source: "Beijing Jeep Statistics, 1984-1994", BJC, 1994.

According to one study (Zhang, 1995), the American parent can earn a net profit of at least US$2500 per car from exporting intermediate goods to Beijing Jeep. In view of such premium margins, foreign car producers had already enjoyed some rewards in entering the Chinese market before their affiliates were established in full

capacity. However, as supernormal returns are theoretically a compensation for risk, it is possible that these margins are required to enter a risky market such as China. Some degree of market power also helps in this respect, and it is noteworthy that Mr Cheng referred to the aim of VW to be "dominant" in China.

Benefits arising from exporting intermediate goods to overseas affiliates is part of the rents accrued through FDI, which usually also include royalties, profit sharing and other income. To achieve high rents in this way is part of the incentive that drives FDI to enter the Chinese market, which was confirmed in the interviews. For example, Mr Zhao of Beijing Jeep said that "Even if Beijing Jeep did not make any money at all, the profits from exporting parts to this firm alone would have been enough to justify AMC and CMC's investment in China". The famous "Beijing Jeep Incident" that occurred in 1986 was a result of shortage of foreign exchange by Beijing Jeep to buy components from AMC, which threatened to derail the whole joint venture programme. Ms Yin Linggu, director of the office of Board of Directors, Shanghai Bell, and the managers of Alcatel Bell, agreed that intermediate goods' trade between parent and affiliate "is very big business". Shanghai VW and Motorola (China) have also relied on the component supply from the foreign parents to keep production in China running. It appears that it is hardly possible for FDI to be committed so heavily in a risky environment like China's without the parent calculating the immediate return from intermediate goods export. All four firms' experience seems to indicate this.

We can now conclude that the leading motive for these four MNCs in the Chinese market is primarily local market servicing and the rents that accrue from the transfer of knowledge and the sale of intermediate goods to affiliates in this market. But, a cautious note should be struck here. We do not claim this as general motives for all firms entering the Chinese market. For instance, investments made by Hong Kong manufacturers in labour-intensive industries in the 1980s, which were entirely resources oriented, are not implicated in this conclusion. Therefore, this finding is more appropriate to industries with a certain technological sophistication.

The motives of these foreign investing firms cannot be easily realised unless they can meet the aspirations of the Chinese government (upgrading their industrial competency by way of attracting FDI), and, in the case of joint ventures, the objectives of the Chinese partners. It is no surprise to find out that the motives of the Chinese side are common and clear. They are in effect to "Get hold of the latest technology and management skills, export for hard currency, and thus revitalise the old state-owned firms by setting up joint ventures with an established foreign firm" (Mr Zhao, Beijing Jeep). The Chinese partners usually requested their foreign counterparts to bring in the most recently developed product as the starting point for the joint ventures. Mr Zhao Nailin, the vice-chairman of Beijing Jeep, commented:

> A good product can ensure at least 50 per cent of the success of the foreign invested firms.

According to him, "good product" here means the kind of product based on the latest technology, and also presenting strong marketing prospects in the Chinese market, and ultimately the international market. It was decided to transfer the Cherokee XJ

series to Beijing Jeep in 1983, when it won the best award for off-road cars in the same year, and was regarded as the jewel of the American Motor Corporation. The S1204 was chosen to be the main product of Shanghai Bell, even when it had only just been developed by the then Belgian Bell (it became part of Alcatel Bell later on). The case of Shanghai VW differs, as Santana was not VW's core product. But, it was considered to be an advanced product when compared with those produced in China. VW made great efforts to transfer the relevant technology to the joint venture. The reason behind VW's offer was that transferring a product (the Santana) whose market was in decline (then in Germany and other European markets), to China, promised to substantially extend the life cycle of this product, ensured the advantageous position gained by VW in the Chinese market. This is a classic case for Vernon's product life cycle theory, which relates emergence of overseas investment to the maturing process of a new product (Fai, 1998). The success of VW shows that it is not necessary to transfer unstandardised technology for the latest products to ensure commercial success in China.

Foreign partners have been expected to bring not only the advanced technologies and management skills, but also distribution and market channels to international market. The Chinese government also grants some incentives, such as tax exemption, to enable the smooth implementation of the business strategies of these joint ventures.

One significant difference has been found between these two industries with regard to the effect of low labour costs (cheap labour), and China can provide a locational attraction especially in this respect (Andersen Consulting, 1997). Labour cost played

an important role in attracting FDI in the automotive industry, as exemplified in the case of Shanghai VW and Beijing Jeep, but was viewed as less important in the telecommunications manufacturing industry (As indicated in the comments by Mr Zheng above, labour cost is only about ten to fifteen per cent of the total cost of Shanghai Bell's product). This is mainly due to the differences between the technologies employed in the two industries concerned: the telecommunications manufacturing industry can be characterised as using cutting-edge technologies with a relatively low proportion of labour cost in total cost, while labour cost shares have been much higher in the automotive industry which is predominantly based on moderately new technologies in its production line. Moreover, it is the more labour-intensive stages that are located in China, although this changes over time.

Denoting automotive production as moderate in terms of the novelty of its technology does not contradict to the fact that huge investments are needed in the R&D stage of each new model. This is still wholly carried out in the R&D centres, usually located close to the headquarters of MNCs, in North America, Europe and Japan. Although some types of R&D have been conducted in the developing countries, as we will see in the case of Shanghai VW, they are mostly adaptations and upgradings of the current models, and therefore strictly not comparable to developing an entire new model, in terms of capital and technological input. It remains clear from the cases discussed that market seeking has been the dominant motive in the entry into the Chinese market, although, resource seeking is also a minor motive in facilitating FDI in the automotive industry as cheap labour can make a more significant difference to lowering the cost of production of the final

product of this industry than that of the telecommunications manufacturing industry. This suggests that the sophistication of the technologies employed in the production line may influence the choice of the firm's entry strategies in their operation in transitional markets.

Another difference in respect of entry motivation among these four firms, but not between the two industries, is that only Shanghai Bell was expected to service the Chinese market alone, while the other three were projected to be a production base for both the Chinese market and other East Asian markets in the long term, although the Chinese market formed the chief target in the near term. As a wholly-owned subsidiary of Motorola group, Motorola (China) is assigned not only to serve the Chinese market, but also to serve the world market at the same time. It is designated to export its core products to other markets under the co-ordination of its headquarters, which is the typical arrangement of a global strategy referred to by Bartlett and Ghoshal (1989). This, however, does not contradict the fact that the aim of Motorola (China) is predominantly to serve the Chinese market. VW and AMC (later CMC) also intended to target the Far East and Southeast Asia market at a later stage. China was from the outset perceived as a potential production base for the emerging East Asia market in the long-term strategy of these two automotive firms. This difference can only be related to firms' business strategies, rather than bearing any theoretical implications. It is a fact that Alcatel Bell has already established several individual subsidiaries in South Korea, Taiwan and Australia to serve these markets, therefore eliminating incentive to develop Shanghai Bell into a regional exporter. Shanghai Bell did manage to export some of its products to China's

neighbouring countries, i.e., Vietnam, Laos, Russia, and North Korea. However, this can be attributed to meeting the Chinese government's export campaign and to seeking foreign exchange from international markets in order to ease payment for the intermediate goods imported from Alcatel Bell. Exporting does not feature in the long-term strategy set by Alcatel Bell. Hence, the strategy towards servicing (or not servicing) the Chinese market is a difference between these firms. It is a difference generated by firm-specific factors, in this case the pre-existing portfolio of regional investments by Alcatel Bell. It is not a difference between the two industries. Equally it has nothing to do with either wholly-owned subsidiary or joint venture. The main factor responsible for the decision to serve the Chinese market alone or not is the business strategy of the firms concerned.

6.22 Entry mode

The success of FDI in China largely depends on the right choice of entry mode. But, as explained in Chapter 3, there are not many options available for multinational firms investing in China's telecommunications manufacturing industry and automotive industry. Before 1990, it was a legal requirement to be in partnership with the Chinese manufacturers for foreign firms wanting to set up local manufacturing affiliates in the strategic industries, including telecommunications equipment manufacturing and the automotive industry. This is evidenced in all the three firms, Shanghai Bell, Shanghai VW and Beijing Jeep, established during that period through joint venture partnership. This policy regarding investment in the telecommunications equipment sector was changed at the end of the 1980s.

Motorola set up its own wholly-owned subsidiary in 1992 following the changes in the above policy. No changes have been made regarding FDI in final assembly in the automotive industry. The Chinese governmental policy encourages the establishment of wholly-owned subsidiaries of MNCs in automotive components production, but requires that joint venture is the only mode of FDI to be allowed in the business of assembling cars. Foreign partners cannot hold more than 50 per cent of equity in this kind of activity at the time of writing.

Though different in terms of technological sophistication, a common theme for the four firms in this research in respect of market entry is that each must find the best entry strategy that can enable them to secure a big market share based on their existing technologies. Given the official restrictions applying to FDI in these two strategic industries, these firms had no choice but to accept what was offered by the Chinese government in the 1980s. This explained the reasons behind the chosen entry mode - equity joint venture - made by Shanghai Bell, Shanghai VW and Beijing Jeep. Motorola, however, opted for operations in the form of wholly-owned subsidiary, after the changes of host government policy. This decision is in line with the argument made by Afriyie (1988: 83) that firms with a leading edge in technology tend to avoid joint ownership participation in host markets. The impact of Chinese government policy on FDI in strategic industries can therefore be clearly inferred from the behaviour of these firms: liberalisation allows firms to choose their preferred mode of participation. But liberalisation, as it comes later, naturally favours firms entering later. The question also arises of whether later entrants are

advantaged relative to earlier entrants unable to extricate themselves from existing joint ventures.

However, in a business environment like China's, it is sometimes necessary to have a Chinese partner to shelter the affiliates concerned from exposure to local disadvantages, which include political risks (Contractor, 1980). The interview data indicate that the success of Shanghai Bell has been largely based on the support given by the Chinese government, which is indirectly the main shareholder of this firm. Ms Yin Linggu of Shanghai Bell, commented as follows:

> I think the Chinese government has given lots of preferential policies to joint ventures since the opening to the outside world. Compared with state-owned firms, joint ventures do enjoy unbeatable preferential policies, such as lower taxation, flexible employment policy, and so on. Shanghai Bell has been a direct recipient of government support in its development course, but not only in the sense of preferential policy. In the first three years Shanghai Bell was in a truly difficult situation, facing the prospect of being shut down due to low market demand. The Ministry of Post & Telecommunications first helped us obtain about 100, 000 lines of orders, enabling us to start low level production and the training of our workers, engineers, and also installing equipment bought from overseas. It then decided to provide subsidies to those purchasing our products. The volume of the subsidies was the difference between our price and that of our competitors. Say, our competitor's price is $500/line, and our price is $650/line, then those firms that purchased the products of Shanghai Bell would be given $150/line subsidy by the Ministry in order to make the prices equal. The subsidy would only last for a two-year period. After the two-year period, Shanghai Bell had to depend on itself. This measure was taken in the second half of 1987. Based on this support, we obtained lots of contracts in the next two years and our production volume began to increase dramatically.

From the above description, we can see that government support has been a very critical element in nurturing success of FDI in operating in China. It includes not only information, consulting, preferential tax, as it is commonly referred to, but also direct subsidy to a joint venture.

The critical role played by the Chinese government in effecting the operation of foreign direct investment has also been found in the cases of Shanghai VW. For example, Shanghai VW was consistently listed as the No. 1 project by Shanghai Municipal Government in the beginning of the 1990s. This meant that the local government would do everything it could to support Shanghai VW in achieving its goals, which usually centred on production expansion. In the case of Beijing Jeep, this assistance resulted in the allocation of foreign exchange directly from the central government to help purchase foreign components, which is a very rare occurrence (For a more focused discussion on government support please see Section "7.3 The key factors in the knowledge transfer and organisational learning process").

It therefore appears that it has not been unwise to choose joint venture as the rational entry mode in China's strategic industries, provided foreign parents can maintain control over their intellectual property rights. Cooperation and support, if obtainable from the Chinese side as a result of choosing joint venture mode, will certainly assist in mitigating or overcoming the L-specific disadvantages and risks (Dunning, 1993: 81), or in reducing the information cost (Casson, 1991: 83). In the case of Motorola (China), it is a wholly-owned subsidiary in its own right. It follows that it has to do everything it can to be a good corporate citizen, which is one of the four key strategies followed in its business operations in China, illustrated in its company profile in Chapter 4. This is also an effective way of overcoming the local disadvantages that is especially attractive to a wholly-owned foreign firm. Moreover, Motorola (China) has also developed quite a number of joint venture affiliates with

Chinese firms in various localities across this country. This is for the purpose of strengthening its competitiveness by partnering with the dominant players of local markets. It also enables Motorola to indigenise itself, but in a flexible manner. This is another one of the four key strategies directing Motorola's business operation in China. It further supports our suggestion that the joint venture is a rational choice of entry mode when investing in China's strategic industries. As explained by Mr Boris Wang of Motorola (China) on its strategy to set up joint venture affiliates later on:

> This is the strategy of this firm, which has been decided by our bosses in Beijing (headquarters). My understanding is that Motorola wants to develop in a way of better utilising the opportunities and resources available in this market. Joint venture exactly meets our needs. Secondly, I think Motorola wants to be a good corporate citizen in China (or in anywhere it operates). That's our cultural promise. Based on a wholly-owned subsidiary, Motorola wants to bring more benefits to Chinese partners including knowledge transfer, and joint ventures are the way of meeting this goal. They will be good for all the partners as well as ourselves.

Therefore, we can see that the underlying common theme for the foreign invested firms is how to secure a more favourable environment from the host market by making a strategic decision on entry mode, irrespective of which industry they are in or which country they came from. In China this "more favourable environment" can even includes discretionary direct support from the host government. However, the fact that these four firms, which are from two industries of different sophistication and of different countries of origin, all chose equity agreement (joint ventures and wholly-owned subsidiary) instead of contractual agreement, highlighted the difference between the Chinese market and those in developed countries where, according to Hagedoorn and Narula (1996), the higher the technological intensity of industries, the more likely a contractual agreement will be chosen. The explanation

for this difference is two-fold. First, the Chinese market is still a risky one, as discussed in Chapter 3, and the adoption of an equity agreement can minimise the possibility of leaking foreign proprietary assets (Harrigan, 1985). Second, due to a large technological gap, foreign investors would be extremely lucky if they can find capable local partners in the telecommunications manufacturing industry and automotive industry in the Chinese market to form contractual agreement-based alliance.

In the joint ventures foreign partners, however, are expected to bring in nearly all the important resources, in terms of technology, management skills and capital, to ensure the prospect of success. The availability of these resources, or, the capability to generate them, is the crucial criterion for the Chinese side to select their foreign partners. This is a more specific manifestation of a similar, but more general, tendency in selecting partners noticed by Glaister and Buckley (1997) in their study of IJVs. According to managers in Alcatel Bell, the Belgian partner in Shanghai Bell provided nearly all the resources needed for the joint venture, such as technology, management skills, capital, marketing expertise and so on. The Chinese partner is only responsible for local approval, apart from providing labour (which is anyway remunerated via the operation of the joint venture) and the production site. The technological superiority of the Belgian partner and its willingness to furnish the essential resources via joint venture was sufficient to convince the Chinese government that Alcatel Bell (then Belgian Bell) was the optimal partner. This has been confirmed in the following comments of Ms Yin Linggu of Shanghai Bell, on the decision to select Alcatel Bell from a group of foreign contenders:

> But the most crucial reason for us to choose Belgian Bell was that, supported by the Belgian government and ITT, it was willing to carry out technology transfer at that difficult time and was capable of persuading the US government to issue a license for this technology transfer project. So, there are two fundamental criteria for selecting the foreign partner of this joint venture. One is the comparatively advanced technology, the other is the potential foreign partner was capable of transferring the relevant technology to us. Only Belgium Bell met the two conditions then. We were especially impressed by the Belgian side's efforts in lobbying and applying for certain licenses for the technology transfer.

In the case of Beijing Jeep, according to Mr Zhao Nailin, vice chairman of Beijing Jeep, the contributions made by the two partners were: On the American side are foreign capital, the latest technologies and management expertise, enhanced decision-making ability, various training programmes, technical support to suppliers, and channels to world markets. On the Chinese side are experienced employees, some production equipment and workshops, certain technology and R&D capability (though at a low level comparatively), long term relationship with suppliers, complete local marketing channels, and contacts with government bodies, banks and other agencies in this market.

It clearly transpires that it is only when foreign partners are capable of bringing in scarce resources which are badly needed by the Chinese firms, i.e., advanced technologies, management expertise, capital and international market channels, is the Chinese government then ready to allow the entry of foreign producers. Subsequently, the government provides joint ventures with various support, such as tax exemption, various preferential treatment in land use, employee recruitment, bank loans, and most important of all, access to China's internal market. This is found to be exactly the case for Shanghai VW, where the Chinese partner provides

experienced labour, workshop, land and a potentially big market. The German partner is responsible for technology, capital, and management expertise. In general, the data collected from this investigation show that the Chinese government has been largely successful in selecting firms with competitive capabilities. The foreign partners in these two strategic industries have both found that the domestic market has been used as a leverage to expedite the transfer of resources by the MNCs to China, such as advanced technology, management skills and so on.

This preference for choosing capable foreign partners to participate in the Chinese market is also evidenced in the Hungarian market (Hooley, *et al*, 1996). In Hungary, only firms with resources that could be used by the local partners to create their own competitive advantages were encouraged to move into strategic industries through the joint venture mode. Being transitional countries, China and Hungary have been desperate to close the gap with Western countries by attracting firms with knowledge assets. This demonstrates the pivotal role played by knowledge resources conveyed by FDI in transitional economies. This transfer of intangible assets is in the broad sense very much in line with the arguments put forward by Hymer (1960, 1976), Vernon (1966), Dunning (1977, 1993) and so on, as reviewed in Chapter 2. A programme of transfer of knowledge resources conducted by MNCs can be used to mitigate their local disadvantages. In the words of Bartlett and Ghoshal (1995: 10) knowledge resources are employed by the MNCs, "to overcome the liability of its foreignness", when carrying out FDI in overseas markets.

6.23 Corporate governance

Chapter 2 has suggested that the design and division of management control in an IJV in transitional markets is a way for foreign partners to limit the "bleedthrough" of their input knowledge and proprietary assets. With no exceptions, the three joint ventures all have introduced western style management systems, with the board of directors as the locus of strategic decision making. This has been enabled through China's economic reform, which has changed the people's mindset towards accepting international practice as a way of enhancing the efficiency of business administration in China. The board of directors is composed of representatives chosen from the partners involved, based on the shares held by them. For example, in Beijing Jeep, there are 11 directors, 7 from the Chinese side and 4 from the American side. Usually, a set of rules or procedures are agreed to define the function and operating process of the board of directors, e.g., "The policy and procedure of the Board of the Directors" in Beijing Jeep. Motorola (China), the only wholly-owned subsidiary among these four firms, on the other hand, is under the direct control of Motorola's headquarters from the US, which is also in line with international practice.

The management team in these joint ventures is headed by a general manager and vice general manger, appointed by the board of directors. These two positions are always held by both foreign partner and the Chinese partner, but in different ways. For example, in Beijing Jeep, the first three general managers were Americans, supported by their Chinese associates. From the fourth one, Chinese have held the

position of general manager and assisted by an American associate. In Shanghai Bell, the general managership is always held by the Belgians according to the joint venture contract, even though the Chinese partner holds the majority of the shares. In contrast, in Shanghai VW, the Chinese have always been appointed as general manager, assisted by German executive vice general manager, although the two partners hold equal shares in the company.

In order to strengthen the implementation of the decisions made by the Board, an Administrative Committee usually is set up in joint ventures, comprising major managers from the different sides. In Beijing Jeep, it is composed of two vice chairmen (one American and one Chinese) of the board of the directors, the deputy general manager and one manager (American) at the department level, and is headed by the general manager(when an American fills this post, his deputy general manager is a Chinese, and vice versa). In Shanghai VW, it is called the Executive Management Committee and is composed of two Chinese (one is the Managing Director, and the other Personnel and Administrative Executive Director) and two Germans (one is the Deputy Managing Director and Commercial Executive Director, the other is Technical Executive Director). Usually each member of the committee has equal voting power and can veto an important proposal if needed. This is designed to safeguard the interests of the foreign investor.

At the middle management level, it is common in the three joint ventures that foreign expatriates are always placed in charge of finance, R&D, quality control, and sometimes production, purchasing and local sourcing. In Beijing Jeep, for example,

the American partner still holds the following departments after 15 years', out of the agreed 20 years' duration of this joint venture, operation: finance, product design, production, purchasing and supply, production engineering, according to Mr Sun Jiashan (chief of the localisation office of Beijing Jeep) and Mr Jiang Kuiduo (chief of division II of production engineering of Beijing Jeep). In Shanghai VW, the German expatriates are the direct managers of finance, R&D, quality control, purchasing and supply departments, while supervising production, localisation and marketing aspects via the executive deputy managing director's post (which was designed to be permanently filled by the German partner). The picture in Shanghai Bell is largely the same. The Belgian partner holds finance, quality control and purchasing and supply directly, while the whole company is under the direction of the Belgian general manager during the lifetime of the joint venture. The division of management roles in this way is the result of the relentless negotiation prior to the signing of the joint venture contracts in the firms concerned. While no direct answers were provided, as in the case of the setting up of administrative committee, the intention behind this type of management governance design is clear – to ensure that the foreign side could control the financial and technological aspects of the joint ventures where they have brought essential resources in. The human capital (professional skills) needed to administrate these resources can only be gained by extensive training and experience. Therefore, these roles are not transferable to the Chinese within a reasonable period. However, there are also appropriability issues at stake, as well as issues of the performance of the JV itself. Being accustomed to endless stories of foreign investors' failures in transitional market, due to their knowledge assets being leaked, their capital diluted, and expatriates sidelined,

foreign partners of these three joint ventures have sought to avoid any loss of this kind by negotiating a secure design of management control with the Chinese partner and integrating it into the joint venture contracts. This transpires that the design and division of management control in an IJV in transitional markets is to limit the bleedthrough of the foreign partners' asset to the local partner.

A vivid example supporting this judgement is the management design in Shanghai VW. At the highest level, in the Board of Directors, five Chinese and five Germans are present, in line with the capital contribution of the two sides, with one Chinese holding the chairmanship and one German holding the vice chairmanship. With the responsibility for deciding major and strategic issues for Shanghai VW, the board of directors oversees the operation of this firm and constitutes the first 'firewall' for the German side to keep control of its technological and financial assets. The second 'firewall' is at the executive level. There is an executive committee of management comprising two Germans (one is the deputy managing director and commercial executive director, the other is technical executive director) and two Chinese (one is the managing director, and the other personnel and administrative executive director). It operates under the principle of unanimous consent, i.e., each of the four members of this committee carries equal voting power, and issues for the consideration of this committee must obtain the support of all of the members. In addition, the two German directors actually control all the essential departments of this firm, both technology related and finance related, leaving only non-essential departments at risk of leaking low-level technology and of diluting assets that the foreign side is cautious about, such as human resources and public relationship, into

the Chinese control. This, plus the guarantee that key departments will be headed by German managers, is believed to have totally eradicated any possibility of "wrong doing" by the Chinese partner, and constitute the third 'firewall'. This precautionary mechanism does work effectively. The German side has supplied a large amount of financial and technological resources, and the rewards for these extensive investments have been considerable[32], and, above all, no case of knowledge leaking nor finance irregularities has been found. At the same time, the Chinese partner has achieved its aspiration to transfer advanced technology and management skills from the MNC, which we discuss later in detail, and in reforming run-down former state-owned firms. Therefore, this case demonstrates that the design and division of management control in an IJV in transitional markets is a way for foreign partners to limit the "bleedthrough" of their input knowledge and proprietary assets. The clear delineation of responsibilities in the JV means that bleedthrough is minimised while cooperation is maximised, and so, it follows, will be the performance of the firm.

A striking feature of the corporate governance of the three joint ventures is the disappearance of the Communist Party cadres, such as party secretaries, from the surface. This is in stark contrast with that in state-owned firms where party secretaries directly carry out primary managerial duties (Child, 1994: 73). However, this does not mean that the Communist Party system does not exist in these firms. Legally, there is no clear reference regarding the activities of the Communist Party

[32] VW holds 50 per cent of the equity share of SVW. It transferred the whole range of technologies of its Santana to this joint venture and, from 1985-1997, contributed proportionately towards the total investment of RMB 6.66 billion in its Phase I and Phase II constructions. With the completion of Phase II construction, SVW now has an annual production capacity of 300, 000 cars and 350, 000 engines. It turned out 230,443 unit of cars in 1997, holding more than 50 per cent of the total car market in China.

and its subordinated groups (the China Youth League, the Women's Association and other "democratic parties") in the Chinese law in relation to FDI. Only trade unions are explicitly recognised. Nevertheless, these political groups have been operating in these joint ventures since their establishment, either publicly in the case of Shanghai Bell and Beijing Jeep, or silently in the case of Shanghai VW. Usually, the Chinese executive managers are key members of the local Communist Party in their respective firms. The proposals presented by the Chinese partner, especially in respect of the promotion of managerial staff, can always be translated as the results of decisions or consultations with the Chinese Communist Party branches in the respective firms. In a word, the Chinese Communist Party branches do exist in the joint ventures. They may vary in the working manner, but they are the same in effecting their influence on corporate governance and business decisions by the Chinese senior managers. The Belgian parent managers of Alcatel Bell commented on this:

> The Chinese Communist Party's involvement in business operation is unbelievably extensive, especially in respect of management localisation. Some of the very promising local staff cannot be promoted to the right positions due to the fact that they are not Communist Party members. Belgian managers don't have a say in selecting Chinese managers. Even when they made suggestions, the Chinese partner did not listen to their advice.

But foreign investors do not need to worry too much about this, as the central goal of these branches is to facilitate the smooth operating of joint ventures instead of organising "class struggle". So industrial relations problems in the west are not experienced in these firms because there are no independent labour unions. However, the price that is paid for the security of the proprietary knowledge of the firm can be compromised. For example, although no public case has been registered

with respect to the leaking of the transferred technologies in Shanghai Bell, it seems to those who have been the expatriates of Alcatel Bell, that most of the key technologies of S12 have been systematically disseminated to other state-owned telecommunications firms in China without the knowledge of the Belgian partner. One piece of evidence is the melting technology in S12 production, an element of the whole technology transferred from Alcatel Bell to Shanghai Bell, which was later found to have been available in most local telecommunications manufacturers. This has been suspected to be a strategy of the Chinese government to use joint ventures as a vehicle of seeking western advanced technologies, which has been orchestrated and carried out by local communist party branches. In contrast, western labour unions are almost completely disinterested in appropriating the technology of the inward investor. Plenty of evidences from the investigation of these firms indicate that these political organisations are generally very supportive towards the decisions of the Director of the Boards and company executive management teams.

No differences have been found between the automotive industry and the telecommunications manufacturing industry, or between the American firm (Beijing Jeep) and the European firms, in respect of corporate governance. A clear consistency, instead, has been evident across the three firms under joint venture ownership in negotiating and designing the corporate governance based on the international practices, which can safeguard the interests of the foreign investors. A clear ownership difference does exist between Motorola (China) and the other three firms, as the former has been managed without any host equity involvement, which is also in line with the international practice. It is clear that all these firms have been

operating largely based on the international rules, which indicates how far the Chinese government has gone to nurture an environment favourable to MNCs. However, because the Chinese Communist Party only operate its command structure in joint ventures, not in wholly-owned subsidiaries, the role played by the Communist Party branches in the decision making processes of the three joint ventures, as described in the above paragraph, signifies the difference between joint ventures and wholly-owned subsidiaries regarding corporate governance in the Chinese market. Foreign investors need to learn to live with this political machine in their pursuit of the Chinese market under joint venture ownership.

6.3 The knowledge that has been transferred by FDI

6.31 The typology of the transferred knowledge

After establishing an affiliate in a new market, MNCs typically seek to exploit their competitive advantages by transferring knowledge to the affiliate in order to develop its capabilities (Chang and Rosenzwig, 1995). This is the case for Shanghai Bell where, as a new establishment, no knowledge has been accumulated locally beforehand. The technologies transferred from Alcatel Bell in every respect of producing System 1204 formed the corner stone of Shanghai Bell's abilities to compete with its rivals in this niche market. The transfers include technical documents and protocols covering more than 1,000 items of different specifications of 15 categories, such as CLSI, sophisticated high-current and high-frequency filters, signalling cables of various types, multi-layer PCBs and raw materials, metal and

chemical materials, etc. Much related computer software and state-of-the-art equipment were also imported to enable the production line to meet the high requirements of System 1204.

The first research question set out for this study is what knowledge has been transferred from foreign parents to their Chinese affiliates. In Chapter 2 it is predicted that the transferred knowledge is a compound of explicit and tacit knowledge, and is composed of technology, management skills and social knowledge. Teece (1981) also argues that knowledge transfer is often a package that includes both the tangible embodiment of the technology and the associated tacit managerial know-how; the two often cannot be successfully separated (Teece, 1981). Alcatel Bell's expertise in operation and management was transferred together with the transfer of technology. One way of transferring managerial expertise is through the hands-on apprenticeship-style management team. As described earlier, the joint venture contract of Shanghai Bell requires that the expatriates of Belgian Bell will always hold the general managership, supported by two Chinese deputy general managers. This model extends to middle management with a group of Belgian staff working in key positions, usually heads of key departments, to ensure that the organisation of production and the quality of products are at the same level to that in Belgian Bell. However, the tenure of these positions is restricted. Chinese associates were expected to learn the management skills from their Belgian counterparts through this hand-on-hand approach. This is augmented by the extensive training programmes in both Belgium and China. It is then expected that the Chinese nationals would take over those positions not designated to be held permanently by

the Belgians. Another aspect of the transfer of management skills is that Shanghai Bell sent some selected people to attend MBA courses overseas. "Upon finishing their courses they stayed in [the parent firm] Alcatel Bell for several weeks or months observing and learning the very practical side of management functions." (Mr Jef Jacobs, programme manager China, Switching Systems Division, Alcatel Bell). As a result of these efforts, Chinese have now replaced most of the Belgian expatriates except in very sensitive positions, such as that of the manager of the finance department.

Both the Belgian partner and the Chinese partner were clearly aware of the importance of social knowledge. The managers of Alcatel Bell regarded social knowledge as the "secret weapon" of their business operation:

> We regard tacit knowledge (including culture) as our secret weapon in business operation. It's important, very important, but difficult to say [articulate] it.
>
> (Mr Jos Caerts, Alcatel Bell)

Moreover, culture was singled out by Belgian managers as an indication that social knowledge had been transferred to Shanghai Bell:

> Certainly the cultural stuff and tacit knowledge in general have been transferred to Shanghai Bell by ways of personal contact, as we are all human beings. But the culture (and tacit knowledge) there in Shanghai Bell is not only from Alcatel Bell, but is a mixture of Chinese culture ["in their country"] and the culture of the west. To be more specific, apart from Chinese culture, there are the cultures and tacit knowledge of Belgium, of Alcatel Bell, of Alcatel Bell's switching systems division, of the engineering department of Alcatel Bell, and of the technology transfer department itself, and so on.
>
> (Mr Jef Jacobs, Alcatel Bell)

Ms Yin Linggu of Shanghai Bell also acknowledged the need to absorb western social knowledge in this new joint venture:

> In respect of management and corporate culture, we must absorb the essence of western culture from their work practices, then make ours more suitable to meet the challenges in front of us ..... Most of our managers came from the state sector. Their thinking has been changing continuously since coming here but they still need to learn more (from their Belgian colleagues) to understand all the new issues in running a joint venture.

Because of the importance of tacit knowledge, the Belgian partner still keeps about 15 expatriates in Shanghai Bell to date (mainly technical assistants) for the sake of effectively communicating between the two firms.

However, there are no specific programmes intended to transfer social knowledge from Belgian Bell (later Alcatel Bell). This was confirmed by the staff of Shanghai Bell during the interviews.

> Yes, social knowledge was transferred, but not formally. The way of transferring tacit knowledge is by co-operating, through training programmes, meetings, technical assistance and other ways of communications. No formal things were written down in relation to the transfer of tacit knowledge, as tacit knowledge itself is hard to be expressed. In general tacit knowledge has been transferred automatically.
>
> (Ms Yin Linggu, Shanghai Bell)

All interviewees acknowledged the difference of Shanghai Bell from Chinese firms in respect of managing processes, communication style and corporate culture. Issues in this regard have been heavily influenced by Alcatel Bell — through Belgian expatriates, training programmes in Belgium and China taught by Belgian experts. Most of Shanghai Bell's staff have been immersed in extensive daily communication between the two firms in the course of technology transfer and business co-operation

— as well as in the Chinese cultural tradition and social environment since the birth of the Chinese firm. Therefore the transfer of social knowledge has been achieved, though without a specific plan, through exposure to national and company cultures as a by-product of the intended transfer of technology and management skills.

The same can apply to Motorola (China)'s Tianjin factories. A greenfield investment, Motorola's factories in Tianjin all had to start from scratch, including the Semiconductor Plant, the Back End Plant, the Pager Plant, the Cellular Phone Plant, the Component and Power Source Parts Plant, and the Semiconductor Wafer Fab Plant. Everything they have in this site, from production equipment to organisational structure, from architectural design to corporate culture, was brought in from Motorola. As a senior Chinese manager (Mr Boris Wang) commented:

> I can only say 'many' or 'everything'. Don't forget this is a wholly-owned subsidiary of Motorola. So everything has been done at the highest level of Motorola. The technologies here are the most advanced in terms of international standards. All the management systems are the same to that in other parts of the Motorola family. And more importantly, Motorola's corporate culture is the core of our operation. Every employee has been trained to follow our culture doctrine. And we provide all we can to accommodate the needs of every employee.

We can note that even when the Chinese partner has substantial knowledge about the main line of business concerned in the joint ventures, the transfer of various know-how from the foreign partner is still extensive, and vital for the building up of the competitiveness of the newly formed firm. As explained in the respective company profiles, the Chinese partners had been producing their main products (passenger car in Shanghai Auto Works, and off road jeep in Beijing Auto Works) for around thirty years before they both engaged in joint ventures. The reason for them to engage in

joint venture partnerships with foreign enterprises was based on the consensus that, both financially and technically, they were unable to develop and produce competitive products on their own, especially when foreign products have been pouring into the Chinese market. At the inception of the joint venture the primary purpose of these two Chinese enterprises were to seek the capital input of foreign partner to develop new competitive products based on the original series of products of the Chinese partner.

However, after realising the great technical gap that existed between their foreign counterparts and themselves, the Chinese partner had to abandon their initial mindset of learning by jointly designing new product, then pursued the large scale transfer of knowledge in relation to one current product from the foreign partner: first in aspects closely related to the products themselves, such as technologies, production equipment, production engineering, and then in product renovation, management skills (finance, human resources management, strategic planning, quality control, supply chain management, leadership skills) and so on. We want to analyse the transferred knowledge in the case of Beijing Jeep in detail to see what has been transferred from the foreign parent to the joint venture in the past fourteen years.

Since its establishment, Beijing Jeep has been a recipient of the kind of knowledge discussed above. In the context of technology, the following has been transferred:

- The XJ series of American Motor Corporation (AMC) based on dynamic (continuous) transfer until 2008 (i.e., AMC will transfer any new development of

the same series products to BJC), including the technologies of product design, testing, manufacturing and quality control. This is the only one of the joint ventures in China's automotive industry in which the foreign partner agreed to contribute its current and future technology (insofar as it relates to the same series of products) as its main contribution to the total investment (The American partner also contributed US$ 8 million cash to the new joint venture).

- Production processes: 105 sets of production equipment (covering assembling, welding, painting and testing) were introduced from various countries (engine production equipment from the UK, Italy and Germany, moulding equipment from Japan, painting equipment from the UK, others from the USA), which were supported by more than 3000 sets of equipment made locally. This indicates that the Chinese partner only introduced essential parts, but strove to achieve self-reliance, where possible, owning to the difficulties of acquiring foreign exchange to import equipment from abroad.
- Computer-based project management techniques, yearly product innovation management processes, manufacturing engineering designing.
- Technical information management based on microfilm and use of computers.

So, the technologies transferred from American Motor Corporation (AMC), and then Chrysler Motor Corporation (CMC), to Beijing Jeep, includes those relating to the product, production processes, R&D techniques, and information management based on computers. It is worth noting here that the transfer is not a totally closed one-way process, but very open. Many technologies in relation to production processes were obtained from the UK, Italy, Germany and Japan, to help ensure technical advancement in the production line of this joint venture.

In respect of management skills, the transfer from the American partner to the joint venture was also comprehensive. Since 1984, the following items have been transferred:

- The corporate governance and organisational model: Beijing Jeep applied the AMC model of corporate governance in its entirety, with the firm being managed by the general manager under the control of the board of directors. It applied the organisational model of AMC, setting up different departments according to lines of business. In order to transfer management skills (including leadership skills) to the Chinese counterpart, American expatriates filled the positions of general manager and of some of the heads of departments during the first four years. Subsequently, they were held by Chinese associates. Later, owning to the poor performance judged by the Board of Directors, Americans were appointed to some of the positions again.
- Human resources management: Some of the human resources management practices of AMC were applied in this joint venture to promote the efficiency of the firm, such as the whole scale labour contract system, breaking the "iron rice-bowl"[33] inherited from China's central planning system. From 1983 to 1988, Beijing Jeep recruited 120 employees through open competition, and fired 30 as unqualified. At the same time, a new remuneration system was set up to make way for promotion based on efficiency.

[33] This means the central and local governments provide every employee in state-owned firms job security and cradle-to-grave welfare coverage. See Warner (1996) for detail.

- Production management systems: such as standard production planning, just-in-time management, and so on.
- Financial practices: such as budgeting, cost management, capital management, management of goods in stock, and computerisation in financial management.
- Marketing expertise: such as after sale service, promotion strategy and implementation of marketing strategy, and so on.
- Quality control system: with its core aim of being "Be the best", based on the concept of "quality control starts from every employee" (see the following page for details of the quality control system introduced)

In relation to the transfer of management skills, there have been various barriers to the process of learning new management expertise, due to the so-called "reality of China". This "reality" has largely become an excuse for not applying the latest management practices in Beijing Jeep. The interview data reveal that western management practices can be applied successfully in Beijing Jeep and other joint ventures. It is the old mindset (the "traditional mindset" in people's minds) that blocks the application of western management ideas in Chinese firms. This shows the importance of renewing people's mental approach to applying management ideas in every aspect of operating a joint venture. This corresponds to the need for the transfer of social knowledge, especially the transfer of corporate culture, from the parent firm – in the case of Beijing Jeep, specifically from AMC and CMC rather than from the Chinese parent.

An example of this is the transfer and application of CMC's quality control system in Beijing Jeep. CMC's quality control management system includes: quality control in the production process (including the quality control of components supplied by local suppliers), quality testing of the product, quality reporting and the information dissemination system.

To some extent, the quality control system is part of technology (quality testing, reviewing and adjusting in the process of product design and production) and management expertise (quality management). However, it is primarily the attitude in every employee's mind that counts, as the quality of the product depends on the contribution of every section of the firm in part and in whole. After its establishment, Beijing Jeep took the quality policy and quality management system wholly and directly from AMC (and later on from CMC), and applied them to its own operations. The quality control system includes: (1) commitment of the management team, setting up the quality control committee; (2) setting up quality control teams in every section of the firm; (3) extensive training programmes on quality control; (4) the dissemination of information on quality control; (5) co-operation on quality control; (6) inter-examination of quality. For example, the components quality control section of Beijing Jeep has wholly applied the "Quality Handbook" developed by CMC, in addition to the specific policy towards local suppliers.

So, the fundamental philosophy behind the quality control system in Beijing Jeep is that high quality can only be achieved through each step of production, and not a

result of testing of final products after errors may have already been made. Extensive training programmes (more than 400 occasions during 1984-1989) were arranged to ensure that each employee of the firm was equipped with the awareness and skills of quality control. As Mr Tong Zhiyuan commented:

> Quality control is not only the business of the Department of Quality Control, but also the responsibility of everyone of this firm.

Following the model of its American partner, "quality first" has been extended to "every corner" of Beijing Jeep. The Department of Quality Control only works as a co-ordinator in implementing the quality strategy of the firm, carrying out quality education and training, making detailed quality policy, e.g., "Quality Policy of Locally Produced Components", and so on.

We conclude that the transfer of modern management ideas may be the most important part in the transfer package. In Beijing Jeep, this has been achieved by the transfer and dissemination of the social knowledge of AMC and CMC, including corporate culture. Without the proper transfer and embedding of these ideas, the transfer and utilisation of both technologies and management skills would not be carried out successfully. People would otherwise have divergent ideas on the technologies concerned, such as its suitability in China, or insist on developing old products or lines of business, in this case BJ212 series, before wholly accepting the more advanced products from AMC or CMC. Hence, the case of Beijing Jeep vividly illustrates the importance of the **integrity of knowledge transfer** that comprises technology, management skills and social knowledge.

Very similar results have been found in the case of Shanghai VW in relation to the types of knowledge transferred from Volkswagen of Germany. The only difference is that, in this 50:50 joint venture, the influence of the German partner is stronger than that of Beijing Jeep. In the latter, the American partner has to utilise many other channels to influence the behaviour of the whole joint venture which otherwise would be impossible based on the American partner's minority equity-holding. After the establishment of Shanghai VW, a "Germanisation" process has been pursued from top management down to workshop practices, and comprehending production, R&D, quality control, logistics, marketing and corporate citizenship. This has been supported by extensive training programmes throughout the year. It is obvious that the above transfer of knowledge covers not only technology and management skills, but also social knowledge, most of which is in tacit form. An interviewee (Mr Cheng Gang) commented on this:

> Certainly there are technology and management know-how transferred. Regarding social knowledge, there is not a single project specifically targeting this end. But social knowledge, such as corporate culture, work practices, and even the way of behaving in this company, has been transferred quietly. We can clearly notice that there are some cultural factors that are actually originating from our German partner. For example, quality consciousness, efficiency consciousness, time consciousness, environment protection awareness and so on. This has been the common sense of the employees of this firm now. In general our corporate culture is a new hybrid culture of the German partner and our Chinese culture.

Based on the above account, we can say with some confidence that the transferred knowledge from MNCs to their affiliates investigated in this research does include technology, management skills and social knowledge, which confirms our argument in Section "2.32 The characteristics of the transferred knowledge in the context of FDI" of Chapter 2. Each of the components of the transferred knowledge has

contributed to the successes as well as the failures of these joint ventures in the past years.

Our research supports the findings of Hymer (1960), who asserted that FDI involved the transfer of a package of resources (technology, management skills, entrepreneurship, etc.), Dunning (1993: 77 and 298) and other researchers (e.g., Howells, 1996). As discussed in the literature review section, MNC is one of the key channels for the cross-border transfer of culture and business customs. Furthermore, social knowledge, which incorporates corporate culture, business custom and entrepreneurship, is an important part of the transferred knowledge, and each type of the transferred knowledge contributes to the building up of the firm's competitiveness in the Chinese market.

It is clear that the three joint ventures have managed to transfer more types of knowledge than they originally wanted. The reason why this happened is worth exploring. During the joint venture negotiation stage, only those "hard" items, such as capital contribution, technologies to be transferred, production equipment to be purchased, the division of management responsibilities and control, and so on, were clearly identified. However, the transfer of management skills were largely absent in the contracts, let alone social knowledge. A manager of the parent Alcatel Bell commented on this:

> Technical training and assistance are part of the contract. But the exact contents and length of training courses were a bit flexible according to the requirements of the Chinese partner. Management skill transfer is not officially part of the contract.
>
> (Mr Jos Caerts, Alcatel Bell)

But, according to these Belgian managers,

> A complete set of management skills (every aspect of business operation) have been transferred to Shanghai Bell, but they are not required by the contracts. They have been presented to the Chinese side as goodwill.
>
> (Mr Jef Jacobs, Alcatel Bell)

The aim of such a "goodwill" is to equip Chinese managers with the latest management knowledge for the purpose of being competitive in a fast growing market. In fact, this has been carried out as a "must do" policy, because "you have to guard your position in this huge market, as there are many others over there willing to transfer" (as commented by one Alcatel Bell manager).

It is evident that the size of the Chinese market, both current and potential, and the competitors from various countries, have been key drivers pushing the wide range of knowledge transfer beyond that originally intended. This strategy of comprehensive knowledge transfer in terms of scope is coherent with the motivation of FDI in entering the Chinese market, with the market-seeking motive being at the core behind the investments of these four firms. The situation of Beijing Jeep and Shanghai VW is very similar to that of Shanghai Bell: management training was later on singled out as a key area for upgrading, for the sake of improving efficiency and of assuring product quality. While little cost has been charged to the affiliate, the foreign investors have portrayed formal and informal management training at different levels as an essential dimension to enable them to compete in the Chinese market.

An important issue relating to the types of the knowledge transferred by MNCs to China, is the level of technology (and other knowledge assets) in the affiliates in relation to the parent firm and affiliates in other countries. This can be distinguished as a difference between the telecommunications manufacturing industry and the automotive industry. Our investigation reveals that in the telecommunications industry, where technological development is continuous, the technology transferred can be characterised as advanced (Shanghai Bell) or even as the most advanced (Motorola). Motorola claims that it "manufactures only world-class equipment in China with the highest technology available" (Motorola in China, 1997, page 2). But, in the automotive industry, only modest (very mature) technologies have been transferred to China by VW, which demonstrates that modest technology can also enable a firm to be successful, and that product selection alone is not responsible for the success of doing business in China. In the case of Beijing Jeep, the technology was the latest then when the transfer took place in the middle of the 1980s, but due to the lengthy process of localisation, it is nearly obsolete now. Although the joint venture contract allows Beijing Jeep to transfer any new development of Cherokee series made by the American parent, an inability of assimilating the transferred knowledge fairly quickly has in practice prohibited this joint venture from taking full advantage of the technological advancement of the American parent. There are no big differences in terms of management skills or corporate culture, as the parents always want to promote the integrity and efficiency by "colonising" its joint venture affiliates in these respects, i.e., bringing the latest, or exactly the same ideas from headquarters. The question is how much can be applied in these affiliates due to the host market situations, host government policies, and resistance from local culture

(national culture of the host country as well as corporate culture of the Chinese partners).

There is one difference in terms of the transferred knowledge between China and other transitional economies, which has its origins in the different technological capabilities between China and these countries. If compared with China's, the economies in the countries of Central and Eastern Europe boast far more advanced technologies and production skills within their respective manufacturing industries (Radosevic, 1998). This means that the gap between them and the western countries in terms of technological advancement is considerably smaller than that between China and the West. On account of the scale of the technology gap, Chinese firms have always sought to prioritise the transfer of the hard elements of knowledge in scientific technology. In contrast, firms in the transitional economies of Europe have tended to seek the transfer of the soft elements of knowledge. The experience of Boras Wafveri's (a Swedish textile firm) involvement in Estonia's biggest industrial firm clearly indicates that management skills – especially marketing and leadership skills – are badly needed in the first instance of transfer to transitional economies (Financial Times, 1996b). Radosevic (1998: 25) also points out that enterprises in Central and Eastern European Countries have to transfer knowledge in those formerly neglected business functions (marketing, finance, and operation management) first, through technological alliances with western firms, before they can become quality and cost competitive partners. Based on our research and others, e.g., Lyles and Salk (1996), Hooley, *et al*, (1996), it is clear that both China and other countries in transition have come to the conclusion that only the transfer of all

types of knowledge can be of use to their economies. This will be further demonstrated in the following section.

6.32 The stages characteristic of transferred knowledge

An important argument generated by this research in the literature review chapter on knowledge transfer is that there is a stages characteristic of the transferred knowledge. Although this "different stage-different transferred knowledge" model has been proved to be true in many earlier studies of cases of FDI (e.g., Chang and Rosenzweig, 1995), some variations have been found in this present investigation between Motorola (China), the only wholly-owned subsidiary and the other three joint ventures.

The interview data show that in the case of Motorola (China), all types of knowledge have been transferred at the same time. There has been a clear development strategy for this wholly-owned subsidiary. Social knowledge was considered as the key to implement the development strategy, and was emphasised in the transfer package from the outset. A senior manager (Mr Liu Hui) commented about this:

> I don't think there is a stage model in our case, as everything – but everything — has been transferred at the same time. All the things done here are following Motorola's way. Technology, management skills and corporate culture and other things are transferred and utilised at the same time.

The situations in the joint ventures are quite different. Although, according to the interviewees, the close relationship between technology and management skills makes it impossible to deal with them separately, different types of knowledge have

been transferred in different stages in joint ventures, a stage approach has been evident.

In practice, a lack of emphasis on the soft management skills caused these joint ventures dearly in the early stage of their operations. Social knowledge has not been transferred in the way seen in Motorola (China), but was transferred along with the other two types of knowledge silently and simultaneously through training, communication, leading and various other activities. The Belgian parent managers commented on the question whether there is a stages model of transferring technology, management skills and social knowledge as follows:

> Seems to us 'no' is the answer to the stages model proposition. Due to the great difference [between parent and affiliate] in business management and technology, knowledge should be transferred at the same time.

Social knowledge has long been identified as things that cannot fit into the needs of a "socialist enterprise". This is due to the "production first" mindset inherited from the central planning era, which still dominates most of those state-owned firms today. Therefore, the Chinese partners of these joint ventures were much more interested in factors that can increase the production volume directly, i.e., advanced technologies (design, production engineering and equipment) and gradually, management skills, than those soft elements that were entirely new to them. Mr Cheng Gang also aired a similar view:

> Generally speaking, technology is the easiest item to be transferred, the second is management skills, while social knowledge is far more difficult, and far more time-consuming. They may begin at the same time (!), but cultural factors will be the last to work.

The impression gained from the above comments indicates that the parties within the joint ventures took the same view on the importance of transferring different types of knowledge at the same time. However, differences can be found in both the perceptions towards the sequence of knowledge transfer and the implementation of knowledge transfer strategy. First, the three joint ventures had different perceptions regarding the sequence of knowledge transfer. Shanghai VW and Shanghai Bell were aware of the importance of transferring different types of knowledge at the same time, and managed to emphasise this by setting up various training programmes from the beginning. The two sides within Shanghai Bell even signed the contract for technical and management training programmes when the joint venture was not yet set up. Though not written in the joint venture contracts, some social knowledge related material was transferred to employees from the very beginning in Shanghai VW and Shanghai Bell as an important part of training programmes. Beijing Jeep, however, was slow in realising the importance in transferring management skills and social knowledge. Only after several years when the management team in this firm realised how important it was to equip their employees with new concepts and management ideas, did they pay much more attention than the other two firms did on the transfer of knowledge in this aspect in order to promote competitiveness, as the formation of dynamic corporate culture based on trust and understanding could reduce the socially generated transaction costs (Buckley and Casson, 1976), to increase efficiency and productivity, and to promote integration across the different affiliates of the whole company.

Second, the effective implementation of knowledge transfer in the three joint ventures occurred in a sequential way. In the case of Beijing Jeep, as discussed above, the transfer of technology (product technology, manufacturing process technology and quality control technology) stood out in the first stage of its knowledge transfer. In Shanghai Bell and Shanghai VW, having realised the importance of carrying out the transference of both hard and soft knowledge at the same time, they found it arduous to achieve a smooth transfer of social knowledge. This is evidenced in the above-mentioned comments made by the senior manager of Shanghai VW. What usually happened in these two firms was the smooth introduction of scientific technologies, while the training programmes for passing over management skills and social knowledge were in an ad hoc status (the progress of these was not as easily measurable as those of technologies). The effective transfer of social knowledge was achieved only after several years' conflicts and compromises between the foreign partners and their local counterparts (Ruan, 1988), which was itself a demonstration of the effort and time required to integrate the Chinese employees into modern business operation systems on the one hand, and to educate the foreign partners in the different practices involved in doing business in China on the other.

Table 6-4: The relationship between foreign equity holding and the stages model of knowledge transfer

Firm Name	Foreign Equity Shareholding(%)	Stages Approach	Social Knowledge Transfer
Motorola	100	No	Strongly emphasised
Shanghai VW	50	Yes	Emphasised
Shanghai Bell	40	Yes	Engaged
Beijing Jeep	31.35	Yes	Emphasised later

To conclude on the stages characterising the knowledge transferred, based on the data from this research, it seems that the stages approach is evident in all the joint ventures but not the wholly-owned subsidiary. As showed in the above discussion, all types of knowledge, including social knowledge (especially corporate culture), have been transferred intentionally at the same time, and right from the very beginning, in Motorola (China). In the joint ventures, the transfer of technology, management skills and social knowledge appear to be effectively carried out sequentially, even though some of them (Shanghai Bell and Shanghai VW) were quick to realise the importance of transfer them at the same time. This has confirmed that our argument holds in the three joint ventures in this research. Our argument that usually key technologies and some management skills were transferred first from the parent to the affiliate, only then to be followed by the transfer of social knowledge, is consistent with the practice within the three joint ventures. The delay in passing over social knowledge from parent to Chinese affiliate is due to the differences over understanding its importance for the establishment of the firm's competitive advantages (Ruan, 1988).

Among the three joint ventures, there is no evidence to suggest that any difference exists between the telecommunications manufacturing industry and the automotive industry. However, if viewed from the perspective of country of origin, the information collected (as discussed in the above paragraph starting with "The impression gained from the above ...") seems to suggest that the American parent, AMC, was comparatively more interested in transferring hard elements of

knowledge to Beijing Jeep, while showing less enthusiasm towards the transfer of social knowledge than the Europeans did. This might be attributed to the differences in terms of international business experience of these three firms (i.e., firm-specific), rather than the difference between American firms and their European counterparts as a whole (i.e., country-specific). It is reasonable to suppose that the fact that both Alcatel Bell and VW had been involved in many joint ventures around world helped them appreciate the importance of the simultaneous transfer of all types of knowledge (notwithstanding their success in doing so). However, a lack of experience in international joint ventures by CMC contributed to its ignorance of the crucial role of the transfer of social knowledge from the start of Beijing Jeep.

6.4 The way of handling knowledge transfer

6.41 The choice of knowledge transfer mode

The current literature suggests that there are three generic international transfer modes available for the international transfer of technology: affiliate licensing, equity joint venture and whole ownership (Kogut and Zander, 1993: 632; Dunning, 1993: 311; Groose, 1996: 782). Among them, it has been found that knowledge that is more tacit, is more likely to be transferred across national boundaries to a wholly-owned subsidiary than through either of the other two modes (Kogut and Zander, 1993: 637). It is revealing that each of the three transfer modes has been used in the firms investigated in this research. This is shown in the following table:

Table 6-5: The relationship of foreign equity holding and knowledge transfer mode

Company name	*Foreign equity(%)*	*Knowledge transfer mode*
Motorola	100	Internal transfer
Shanghai VW	50	Joint venture
Shanghai Bell	40	Affiliate licensing
Beijing Jeep	31.15 (1983) 42.40 (1994)	Joint venture

The interview data from Motorola (China) confirm the argument made by Kogut and Zander (1993: 639) that internal transfer is of great importance to the strengthening of the firm's long-term competitiveness. The technologies transferred from Motorola's headquarters to its Tianjin site were at the forefront of the semiconductor industry at that time (as shown in Motorola's Profile in Chapter 4), enabling it not only to serve the Chinese internal market, but also to supply the world market. These advanced technologies, along with management skills and corporate culture, formed the core of Motorola's firm-specific advantage in the Chinese market. Only when these technologies became standardised in the world market, though still competitive if compared with those available in the Chinese local producers, would Motorola (China) make further transfers of these relatively obsolete (within Motorola) technologies to its Chinese joint venture affiliates by way of affiliate licensing. This knowledge transfer strategy enabled the Motorola group to extend the life cycle of its technologies, maximise its gross benefit from the Chinese market without weakening its own technological superiority. The result is Motorola (China)'s competitiveness in the Chinese market has been greatly improved. This case once again demonstrates that transferring knowledge from parent to subsidiary has been vital in creating comparative advantages for firms engaging in international market.

Alcatel Bell chose affiliate licensing as its way of knowledge transfer. However, the license agreement only covered the technological aspect. It is one of the three contractual agreements signed by the two partners regarding the establishment of this equity-based joint venture, which include: (1) the joint venture contract (signed in July 1983); (2) the technology transfer contract and (3) the direct supply contract. The latter two were signed in April 1984, although all the contracts were discussed at the same time. Technical training and assistance were also part of the contract. But the precise content and length of training courses were somewhat flexible, to accord with the requirements of the Chinese partner. The transfer of management skills was not officially part of the contract, as the partners involved, especially the Chinese partner, did not realise the imperative of addressing issues related to this aspect until later on. Hence various programmes facilitating the transfer in management skills were provided as a supplement to the technology transfer package.

The rewards to an investment made by a multinational firm may include: (1) a share of the profit according to its share of equity, i.e., dividends ; (2) a royalty; (3) revenue from goods and services supplied; (4) revenues according to the price received for technological materials. According to Mr Zheng Yulu of Shanghai Bell, Alcatel Bell has not only got dividends from Shanghai Bell in line with its equity holding, it also profited from selling components to Shanghai Bell. The parent also picked up a sliding scale (2-4 per cent) of total revenue of Shanghai Bell for 10-15 years as royalties, and was also paid for the technological materials at a rate of US$0.8/page. It is worth pointing out here that roughly the same prices were set with which to charge Shanghai Bell as with other joint ventures of Alcatel Bell in other

countries for transferred technologies. Management training, however, has been free for Shanghai Bell. The method through which Alcatel Bell derived its earnings (local sales and tied component sales) has further demonstrated that Alcatel Bell's motivation for entering into the Chinese market was market-seeking, rather than resources-seeking or efficiency-seeking.

The two joint ventures in China's automotive industry, Shanghai VW and Beijing Jeep, have both employed the joint venture mode for knowledge transfer, i.e., knowledge transfer and technical assistance becoming part of the investment of the foreign partner in the joint venture concerned. However, there are differences between them. The most obvious one is that, in the case of Shanghai VW, German VW provided a complete range of technologies on one mature product: the Santana, and promised to engage in joint development in the future refining of this product along with the Chinese partner. In the case of Beijing Jeep, AMC (and later on CMC) promised to transfer both the technology and any new development on its XJ series during the twenty-year life of this joint venture. It seemed that the Beijing Jeep deal was much more favourable to the Chinese investors, but the result of this research showed that Shanghai VW has been more successful in terms of knowledge transfer and utilisation, as indicated in Chapter 4.

Due to the limited number of firms investigated, we cannot give a sound generalisation on the employment of knowledge transfer modes among foreign direct investors in the Chinese market. Our data only indicate that both affiliate licensing and internal transfer are used in the telecommunications equipment industry, while

joint venture is the main way of knowledge transfer in the automotive industry. The technical capacity of the recipient firms could be seen as an important factor affecting the choice of transfer mode in the automotive equipment industry, but the more important determinant is the host government policy on foreign direct investment in this industry, which allows the establishment of joint venture (at most 50:50) as the only legal form of foreign involvement in the car assembly industry. Reluctant to invest massively in an uncertain market, these two car manufacturers were wise to commit their technological resources into the joint ventures in exchange for equity share, and more importantly, a physical presence in a rigidly regulated, but highly expected transitional market (as discussed in Chapter 3). In the telecommunications manufacturing industry, it appears that the factors listed in previous studies (e.g., Davidson and McFetridtge, 1985; Kogut and Zander, 1993; Zander and Kogut, 1995), such as the tacitness of the knowledge, the age of the knowledge, the firm's experience of prior transfers, the R&D intensity of the transferor and the prior existence of an affiliate in the recipient country, and so on, were found to be relevant. The case of Motorola (China) also supports the argument of Dunning (1993: 311), who suggests that newer technologies – those which represent a radical change in the state of the art, those which require the presence of related industries and sophisticated supply capabilities if they are to be used properly, and those where the perceived risk of loss of proprietary rights is the highest – are most likely to be internalised. Motorola's firm-specific advantages include not only its advanced technology, but also its effective management expertise and unique corporate culture, of which quite a large share is tacit in nature. Internal transfer was chosen by Motorola to prevent the dissipation of its whole-

range competitiveness in the process of knowledge transfer under either joint venture or licensing. Relatively speaking, the two automotive producers' practice emphasised technology more than tacit knowledge transfer. It is, of course, difficult to isolate cause and effect, as host government policy required the joint venture mode. However, the impression is gained that the existence of a local partner complicates the transfer of tacit skills and soft technology. These joint ventures only actively involved the transfer of tacit knowledge after encountering huge challenges in assimilating and utilising the transferred technology. This confirms the argument of Kogut and Zander (1993: 637) that the more tacit the knowledge is, the more strong the incentive to transfer to a wholly-owned subsidiary. Shanghai Bell chose licensing as the way of transferring its technology to protect its interests in a highly regulated industry when the host investment environment was still far from stable. This behaviour is consistent with Dunning (1993) that the host market situation, such as the openness of the market, government intervention, and so on, can influence the choice of transfer mode.

6.42 The execution of knowledge transfer

In this part, two issues will be dealt with: one is knowledge transfer route, the other is the volume of knowledge transfer.

Knowledge transfer route

Knowledge transfer route is the way of delivering the knowledge to be transferred. Chapter 2 discusses various transfer routes and suggests that sending expatriates to overseas affiliates is very important to facilitate knowledge transfer, as expatriates can perform key functions, enable communications and provide training to local staff (Chang and Rosenzweig, 1995: 18).

It is revealed by our investigation that there is not much difference between these four firms in terms of transfer route used. When asked which knowledge transfer route was employed, such as staff exchange, management training, books, computer software, etc., the answers from interviewees of respective firms were as follows:

Motorola

> We have employed all of them. Because we are a subsidiary of Motorola, and every means has to be used to make sure that this firm will be at the forefront of similar industries in the world, so every possible transfer route has been utilised to make the knowledge available here at the fastest speed.

Shanghai Bell

> The routes are mainly composed of: (1) Documentation. A list of documentation is available, under which a complete set of documentation will be sent to the joint ventures automatically, and the Belgian side keeps all the receiving parties updated. Through this the joint ventures can keep in pace with Alcatel Bell in terms of technology and engineering development; (2) Training (a detailed training schedule is available); (3) Technical assistance, including sending expatriates to Shanghai Bell (about 40 in Shanghai Bell at one time, about 10-15 today) and daily follow-ups carried out by special teams. All these will in future be achieved by digital routes, such as email.

Shanghai VW

> In many ways, including sending managers and engineers to Germany, inviting German experts to Shanghai VW to give training programmes, exchanging of information, co-ordination and training programmes. Specifically, we require

that unless they have attended extensive training programmes, workers will not be allowed to work on production line. Some of them were trained in Germany and spent some time in working on the production line there. We also sent some of our engineers to VW's subsidiary in Brazil for training, because Santana was originally developed and produced for that market as well as for the European market.

Initially, the exchange of information was achieved by post or by person, now it is mainly by email or other online protocol transfer. There are also a number of experts sent by the German partner to Shanghai VW. This is part of the Technical Assistance Agreement, which is based on our requirement now and then.

Beijing Jeep

Training in both the USA (during 1984-9, more than 300 engineers were sent to AMC and then Chrysler for training) and BJC, technical documents (more than 50000 pages, including technical materials and whole blueprints of the XJ series), ad hoc seminars (more than 400, in total having trained the equivalent of 2400 man during that period), constant co-ordination, technical assistance on site and on line.

Based on these statements, we can therefore say that the transfer routes employed in these four firms includes: (1) technical documentation; (2) training programmes both in-house and in the parent firm, or sometimes in other subsidiaries of the same group; (3) technical assistance, including sending expatriates to the affiliate ("on-site assistance") and continuous co-ordination between headquarters and the affiliate ("on- line assistance"). This is represented in the following table:

Table 6-6: Knowledge transfer route in the four firms

Name	Technical documentation	Training programmes			Technical assistance	
		in-house	parent	Other sites	on site	on line
Shanghai Bell	✓	✓	✓		✓	✓
Motorola	✓	✓	✓		✓	✓
Shanghai VW	✓	✓	✓	✓	✓	✓
Beijing Jeep	✓	✓	✓		✓	✓

It is worth noting that social knowledge was not intentionally transferred through any formal routes as described in this table, rather, its transfer was achieved as a by-product of the above transfer programmes.

Sending expatriates to the affiliate, referred to as "on- site assistance", was cited as essential among the routes mentioned above by the four firms. It may be necessary to clarify at this stage that, although all the expatriates are expected to facilitate knowledge transfer through their respective duties, most managers with long-term assignments (according to the division of management control between partners in the joint venture contract) are also charged with protecting the interests of the foreign partner(s) within their capacity, working like guard dogs. Only those technical assistants, advisers and some short-term managers of the foreign partner are solely servicing knowledge transfer.

All four firms in this study have used expatriates to enable knowledge transfer. In Shanghai Bell, hundreds of short-term technical assistants were sent by Alcatel Bell to help set up the production line and streamline the management systems. Due to the contribution made by those expatriates in terms of passing on tacit knowledge and bridging technical gaps, the Chinese partner still keeps about 15 expatriates in Shanghai Bell (mainly for technical assistance) up to date for the sake of effectively communicating between these two firms. In Motorola, sending expatriates was regarded as the main way of enabling the delivery of high quality products and the

transference of integrated corporate culture right from the beginning. The situation in Shanghai VW is similar. According to Mr Cheng Gang:

> [Every year] dozens of German expatriates come here to do their jobs in production and management related areas. This is part of the Technical Assistance Agreement signed by the two sides at the beginning. The exact number of expatriates usually depends on our requirement in the process of production upgrading.

Mr Sun Jiashan and Mr Jiang Kuiduo of Beijing Jeep reported that "On average nine expatriates have been working in Beijing Jeep annually. There were thirty at one time and now only six are staying in this firm now." While the production is already stabilised and that no new project is yet coming out, these six expatriates are actually intended to fulfil two duties: (1) continuing knowledge transfer and refining production and management, (2) acting as "guard dogs" of CMC, filling those positions designed to be held by American.

In general, although the cost of keeping expatriates is extremely high, it is clear from the practices of these firms as discussed above that expatriates have been welcomed by all the four firms as a bridge with which to close the knowledge gap and to overcome communication barriers. This confirms our argument in Section "2. 42 The execution of knowledge transfer" of Chapter 2 that sending expatriates to MNCs' affiliates to emerging markets is essential to enable the recipient company to acquire and utilise the transferred knowledge much more effectively. This finding provides additional evidence in support of the argument made by Groose (1996) and Chang and Rosenzweig (1995) on the importance of the "grafting" of individuals in the process of knowledge transfer. The expatriates appeared to be a key channel in

facilitating headquarters-affiliate communication, which is a function also emphasised by Marschan (1996) in her study of Kone Elevators. This is also evidence of Nonaka and Takeuchi's (1995) notion of knowledge transfer through socialisation and internationalisation, which are based on the exchange of personnel and extensive communications among employees of different units within the same company.

As the cases on which this research is based are all large-scale FDI in China, where very sophisticated knowledge has been transferred in great volume in the past decade or so, this research can only conclude that the relationship between the knowledge transferred and the transfer routes chosen in these two industries appears to be that, when the transferred knowledge is complex, more routes are chosen. In these cases, each route of those generalised above has played its own role in the whole knowledge transfer process. All of them are required to ensure the effective delivery of knowledge needed by the affiliates concerned. However, sending expatriates to affiliates is the most important one, as it facilitated knowledge transfer in the firms concerned through expertise available on site.

No obvious differences appear between the telecommunications manufacturing industry and the automotive industry, nor between American firms and European firms. There are, however, some differences between the wholly-owned subsidiary and joint ventures. In this research, it is evident that the emphasis in sending expatriates to Motorola is overwhelmingly predicated upon facilitating knowledge transfer, and the headquarters had full discretion over deciding the most effective

transfer route with absolute authority and maximum flexibility. The joint ventures, on the other hand, had to go through a negotiation process between the partners on a case-by-case basis when any plan was initiated. Expatriates sent to the Chinese affiliates were also expected to guard against any possibility of leaking the intellectual property owned by the parents, as discussed in Section "6.23 Corporate governance" of this Chapter.

The volume of knowledge transfer

Before discussing the issue of knowledge transfer volume, we have to establish how to measure it in practice. The direct answer from the interviewees is that the volume of the transferred knowledge cannot be accurately measured. As has been discussed before, knowledge consists of technology, management skills and social knowledge, and each of them includes both explicit and tacit contents. Tacit knowledge is in its nature not quantifiable. This was clearly addressed by one interviewee of Motorola, Mr Boris Wang, who queried how people could count the volume in things such as management and cultural issues. Due to this very nature of tacit knowledge, the entire knowledge transferred from parents to these affiliates in this research, or those transferred between any firms, is not measurable in whole. This is in stark contrast with the arguments made by Groose (1996), as discussed in Chapter 2, who said that the volume of transferred knowledge could be measured by the number of training days per year for staff, the number of expatriates employed, and the number of visits by headquarters experts per year, or through the technological royalties and fees for technical services paid by the affiliate to the parent. The problem with Groose's

approach is that it ignores the difference between explicit knowledge and tacit knowledge, therefore failing to point out the nature of tacit knowledge being unmeasurable. His suggested ways of measurement are largely indicative, addressing only a small part of the entire body of the transferred knowledge.

Although it is hard to measure the volume of the total knowledge transferred, interviewees of both Shanghai Bell and Beijing Jeep all indicated that the explicit knowledge could be counted by pages or by value based on pages. This indicates to us that, when obliged to do so, this is how they conceptualise and operationalise the issue. For example, Alcatel Bell charged Shanghai Bell on those transferred technical materials at US$0.80/page. Beijing Jeep, on the other hand, reported that more than 12000 pages of technical materials and the whole set of blueprints were transferred from the American parent to this joint venture during 1984-1997. The initial technological input from the AMC, according to the joint venture contract, was the right by Beijing Jeep to access the whole range of information about AMC's XJ series, including any new development within twenty years. But, no means has been mentioned regarding how to measure the volume of tacit knowledge due to its nature as discussed above. These means of measuring the transferred knowledge in the firms visited are clear and comparable only for those embedded in documents that cover mostly technology and management skills, and to a lesser extent, social knowledge, which can be articulated and put on paper, such as rules, the official version of corporate culture, and so on. Quite a large proportion of tacit knowledge, irrespective of technology, management knowledge and social knowledge, is

excluded. It seems that a perfect way of measuring the volume of the transferred knowledge is not available due to the very nature of tacit knowledge.

However, there is still a need to compare the transfer volume between firms in order to examine the critical factors affecting the delivery of knowledge from parents to affiliates. Although we agree that the volume of knowledge transfer between two small or less sophisticated firms in terms of industrial complexity is usually less than that between two large, or more sophisticated firms, we cannot compare directly the volume of knowledge transfer between firms of similar size and in similarly sophisticated industries. As both the telecommunications manufacturing industry and automotive industry are sophisticated industries (though the technologies employed in the former are in general more advanced than those in the latter), and the four firms of this research are among the top tier FIEs in China in terms of their size, we assume the knowledge transferred from their foreign parents to these firms are "commensurately" huge. This will enable us to examine the important factors influencing the volume of the transferred knowledge in the firms concerned under comparable conditions.

We suggested in Section "2.42 The execution of knowledge transfer" of Chapter 2 that the knowledge gap between the foreign parents and their affiliates, and competitive condition in the host market, would directly affect the knowledge transfer volume, i.e., when the gap is bigger or the competition is more intense, the knowledge transfer volume will be larger than otherwise. Regarding the first factor, the knowledge gap, the data collected indicate that it does not hold strongly in the

firms visited. The knowledge gap does not play a role in either the newly established firms, such as Motorola (China) and Shanghai Bell, or those in which the Chinese partners already have accumulated some expertise and experience in the main line of business concerned, such as Shanghai VW and Beijing Jeep. The knowledge transfer volume, in these cases, is a result of the contract signed by the two sides, which has clear clauses on the contents of the knowledge to be transferred in order to fulfil the objective of the firms concerned. One senior manager of Shanghai VW, Mr Cheng Gang, commented on this as saying:

> In fact, the technologies related to this specific product have all been transferred regardless the production volume— one or one million.

The difference between wholly-owned subsidiary and joint ventures might be that knowledge in more than one line of business is transferred in WOS while in the case of joint ventures usually knowledge of only one line of business is transferred. The former has been supported by the following comments stated by Mr Wang, a senior manager in Motorola (China)'s Tianjin site:

> There is no relationship, in our case, between knowledge transfer volume and knowledge gap. Why? This is a wholly-owned subsidiary of Motorola, and Motorola wants to build this firm not only for the Chinese market, but also for the whole world market. Most [types] of our products are exported to Motorola's market in the world [though by value most are still sold in China]. The only consideration, I understand, is how to make this firm the best in the world. We in Motorola are the best in terms of semiconductor, pagers and mobile phone production. Our headquarters in the USA send the most advanced technologies and production equipment to this firm.

In the case of Shanghai Bell, just as that explained by one senior manager of Alcatel Bell, the "Knowledge transfer has always been carried out as soon as possible according to the relevant contract, and no constraints were imposed" (Mr Jos Caerts,

head know-how and technology transfer, Bell Telephonelaan 3, Switching Systems Division, Alcatel Bell). Unlike Motorola (China), each of the three joint ventures in this research involved only one product, i.e., S1204 in Shanghai Bell, Santana in Shanghai VW, and Cherokee in Beijing Jeep. That means the transferred technology in these three firms seems generally no more than that projected in the joint venture contracts establishing these firms.

However, having defined knowledge is composed of technology, management skills and social knowledge, we do find that there is a relationship between knowledge transfer volume and knowledge gap, if not for technology alone (as far as we can discern of the present evidence). The interview data strongly indicate that the volume of the management skills and social knowledge transferred in the joint ventures have been much greater than that predicted at the very beginning in the contracts, thus making the total knowledge transferred in each of them greater as a result. It has been revealed that in the joint venture contracts signed only very few words appeared in relation to the provision of management training by the foreign parents. But, in practice, extensive training programmes have been arranged to transfer management skills to the three joint ventures concerned. In addition to that, foreign expatriates have been appointed to be managers of key departments, and lots of short-term technical and management experts have been invited to deliver the expertise needed on a case-by-case basis. Social knowledge has been transferred, as a by-product, to these firms through these extensive exchanges, and all the interviewees acknowledged the differences of their management style and corporate culture from that of the Chinese state-owned firms.

Therefore, it transpires that the increase in knowledge transfer in respect of management skills and social knowledge was not a result of the contracts signed. The increase has resulted partly because of the knowledge gap in respect of management capability and corporate culture, the lack of which often contributed to the failures and low efficiency of knowledge utilisation in these firms; and partly because of the competitive strategies of these firms in this transitional market, as these firms gradually realised the importance of learning management skills and transferring social knowledge for strengthening the firm's competitiveness in this transitional market. We can conclude that knowledge gap in terms of management skills and social knowledge is a key factor in affecting the knowledge transfer volume in joint ventures – the bigger the knowledge gap is the greater the transferred knowledge (relating to management skills and social knowledge) will be. But this conclusion does not hold in the wholly-owned subsidiary, as showed in the case of Motorola in this research.

Competition is another factor worth exploring. On the face of it, none of the four firms (except the Chinese partner in Shanghai Bell) openly support that the more intense the competition is, the greater the volume of the transferred knowledge will be. For example, from the interviews with managers of Beijing Jeep, e.g., Mr Zhao Nailin, Tong Zhiyuan and Mr Chen Xulin (general manager, 1988-93), it is clear that the American partner consistently supported the fast transfer of technology and management skills according to the contract, whatever the market competitive situation was. The knowledge transfer in Shanghai Bell and Shanghai VW has been

carried out strictly according to the joint venture contracts, as described above, irrespective of the specific market competition situation. When we examine the business strategies with respect to knowledge transfer in these firms, however, it is clear that market competition has been a crucial factor in pushing up the knowledge transfer volume. In line with the argument made above on the role of knowledge gap in spurring knowledge transfer, market competition has been another factor of importance in affecting the knowledge transfer volume. We now examine this factor below.

Since the beginning of the 1980s, both the telecommunications and automotive industries have been selected as pillar industries, among others, by the Chinese government, and various preferential policies have been granted to attract FDI in these industries as well as encouraging the upgrading of indigenous firms. As a result, most of the world famous producers, i.e., *Siemens, GPT, Lucent, NEC, NOTEL, Alcatel Bell, AT&T, Ericsson, Nokia* in the telecommunications industry, and *GM, Ford, Chrysler, Volvo, Daimler-Benz, VW, Honda, Toyota, Mitsubishi, Citroen, Peugeot, Daihatsu and Fiat* in the automotive industry, have been pouring their resources into these sectors in order to position themselves to exploit the potential of the Chinese market. Remarkably, the two sectors have turned into buyer's markets in the 1990s based on the substantial efforts made by these MNCs and indigenous firms. Market competition, as a result, has been increasingly intense in these two industries.

As a reaction to the heated competition, the firms selected in this research have sought to strengthen their competitive advantage by transferring more knowledge from their parent firms. In the case of Motorola, more lines of businesses have been introduced to improve the existing product offerings and to build up a greater competitive edge over its rivals. These products include: semiconductor, pagers and mobile phone production. A new wafer plant has just been finished to provide components for Motorola's main line of business worldwide. Another result of the fierce competition for Motorola is the change in its business strategy. Unlike earlier when it overwhelmingly relied on the knowledge transfer from its own headquarters, Motorola (China) has been very active in establishing joint R&D centres with prominent Chinese research institutions and universities, and has worked very hard to be in partnership with major local producers in setting up joint ventures based on the technology and management skills of Motorola itself. This change of strategy has given Motorola a much stronger base in meeting competition in the Chinese telecommunications equipment market.

In the case of the three joint ventures, in order to strengthen their competitiveness, they have: (1) realised the importance of the contribution of management skills and social knowledge to the whole performance of firms, and actively involved the transfer of knowledge in these two aspects. For example, Beijing Jeep emphasised the learning of managerial expertise from foreign expatriates and invested heavily in arranging relevant training programmes. It was then obliged to reverse the trend of management localisation by re-appointing foreign expatriates as managers of key departments, such as production, product R&D, quality control, finance, purchasing

and supply; (2) tried to transfer more upgraded technologies from their foreign partners to strengthen their competitive position in the Chinese market, e.g., from E family to J family of S1204 system in the case of Shanghai Bell, the continuous annual upgrading of the Cherokee series in the case of Beijing Jeep (though it had problems in meeting all the requirements on components), and the integration of environmental technologies from VW into its new product, the Santana 2000, in the case of Shanghai VW; (3) sought to develop stronger R&D capabilities based on the co-operation with their parent firms, e.g., Shanghai VW's Santana 2000 and the latest mode Santana 2000 GTI. Also the transference of new knowledge by way of setting up new joint ventures with their parent firms, e.g., Belling, a new joint venture between Alcatel Bell and Shanghai Bell. However, the proposal to transfer a new line of product – passenger car production line – in Beijing Jeep was never achieved due to the opposition from the Chinese central government.

From the above accounts of the four firms, we can discern the influence of market competition in the transfer of knowledge from MNCs to their affiliates in the Chinese market, which is in line with our theoretical proposition contained in Section "2.42 The execution of knowledge transfer". Some interviewees explicitly support this argument, for example, Ms Yin Linggu of Shanghai Bell presented the following analysis as follows:

> From the perspective of the foreign partners, it is right to say that when the competition is fiercer then the volume of technology transfer will be bigger. Only in this way could the foreign partners get a fair share of this market, as their target is market share. If the competition is not so intense, then they will naturally hold back some of their technologies in order to make more profits later. They do have a strategy on how fast to transfer, how much to transfer. But, from the perspective of the Chinese side, we do not want to connect the competition situation here in the Chinese market to the volume and speed of

> technology transfer. We prefer a clear timetable on transfer process whatever the market situation is, because what we want is the technology. Of course, we like it faster and for there to be more in the technology transfer, if the market competition is very intent.

A simple fact from the above description is that Motorola has transferred more lines of business to its Chinese subsidiary, setting up several new production bases in both Tianjin and other provinces, while the three joint ventures have tried to consolidate their positions in the Chinese market by transferring upgraded technologies within the same line of business (even the same product). This difference in terms of the volume of the transferred knowledge arises from the different levels of equity ownership of foreign parents in these firms: Motorola treats Motorola (China) entirely as its own child, offering everything necessary to nurture the development of its wholly-owned subsidiary; VW, Alcatel Bell and Chrysler, on the other hand, have been reserved to put in technological resources in a jointly owned affiliate, with the majority (in the case of Shanghai Bell and Beijing Jeep), or at least half (Shanghai VW), of equity controlled by their Chinese partners. This fully supports the argument that the volume of the transferred knowledge is affected by the degree of active involvement of the foreign parents (Lyles and Salk, 1996) or ownership (Groose, 1996).

The other comparison that can be made is the volume of the transferred knowledge between Motorola (China) and Shanghai Bell of the telecommunications manufacturing industry, and Shanghai VW and Beijing Jeep of the automotive industry. The telecommunications manufacturing industry, along with the computer industry, has been at the forefront in technological advancement in the past two

decades, and the liberalisation taking place as a result of opening up national markets has in fact transformed the competition in the telecommunications industry into a global one. As indicated above, China has been regarded as potentially the largest market in the world by MNCs, and competition has been intensifying. Hence, both Motorola and Alcatel Bell have transferred the most advanced technologies to their affiliates in the Chinese market, followed by substantial efforts in making corresponding management skills available to their Chinese employees. The volume and novelty of the transferred knowledge is much greater than first planned.

The automotive industry, on the other hand, is primarily based on modest technologies, and the speed of technological advancement is not as quick as that of the telecommunications manufacturing industry. Technologies transferred to Shanghai VW and Beijing Jeep from their respective parents have been very mature, representing a significant time lag from their use in western Europe and North America. The impression gained from the above analysis is that the volume and novelty of the transferred knowledge in the telecommunications manufacturing industry have been much greater than in the automotive industry. This is in line with our argument that labour cost has been much less significant in the former than in the latter.

One of the most striking findings from this investigation is the significance of market size in affecting the speed and volume of knowledge transfer. To a large extent, it is the size and growth of the Chinese telecommunications equipment and automotive markets that pushes multinationals to be involved. The Chinese

government is aware of this and has been looking for great rewards from foreign investors in exchange for market access. Knowledge transfer is the most important target on the reward list. "China expects companies to produce locally and transfer know-how in a full range of sectors" (Engardio, *et al*, 1996: 21). In the case of Shanghai Bell, it is the future market size that attracted Belgian Bell to be in partnership with the Chinese firm. This encourages the parent to transfer a whole package of technology to the joint venture, accompanied by extensive training programmes, and to keep transferring new technologies even though Shanghai Bell failed to occupy even an acceptable market share in its first three years. Long-term vision has been referred to as one of the key factors enabling Shanghai Bell's success. But the true picture of "long-term vision" is the accelerating demand for high-technology telecommunications equipment in China. Mr Zheng Yulu of Shanghai Bell commented:

> Yes, foreign partners do relate the volume and speed of technology transfer to the size of the market. They are very clear on this: the bigger your market is, the more and faster the technology transfer will be. On the contrary, the smaller your market is, the less and slower the technology transfer will be. In fact, what we (Chinese) are really in control of is our huge market. We have traded our market for the technology we wanted.

In the case of Shanghai VW and Beijing Jeep, the "Chinese market" was cited as the primary incentive to push the foreign parents to take concrete action in setting up joint ventures and carrying out extensive knowledge transfer, although the Far East market was also mentioned as a future target of expansion. The signing of the joint venture contracts, which indicates the commitment of the foreign investors to the Chinese market, has proven the attraction of the Chinese market — in particular its future size.

We conclude that the size of the Chinese market has in the first instance played a very important role in pushing Alcatel Bell, VW and CMC — and so many other MNCs — to agree on transferring their key technologies in exchange of the access to this market. Market size continues to be a dominant factor in the process of knowledge transfer. Indeed, the fact that the potential size of the Chinese market became a reality in the past decade, has prompted fierce competition and created a greater need to transfer latest knowledge. In the case of the only wholly-owned subsidiary, the establishing of Motorola (China) was mainly to address the needs of the Chinese market, as well as turning China into a production platform for the international market, which therefore forms part of the internationalisation strategy of Motorola. The continuous increase in the wake of the investment package in China by Motorola, from US$1.2 billion to US$2.5 billion by the end of 2000, as shown in "Motorola Profile" of Chapter 4, is an indication of the importance of the Chinese market within Motorola's global strategy and its success in implementing this. To a certain extent, market size has become the only meaningful leverage to influence the volume and speed of knowledge transfer carried out by multinational corporations in the Chinese market. This has not only confirmed the findings of Grosse (1996), but also has indicated the importance of market size in affecting the MNCs' competitive strategy in transitional markets. Clearly, few countries can come cross to China's market potential (the notable exception being India).

6.43 Knowledge transfer cost

Many factors affect the cost of knowledge transfer. Among them, the relating literature has identified that tacitness of the transferred knowledge (Kogut and Zander, 1993), previous experience in transferring technology (Teece, 1977) and absorptive capacities (Lan and Young, 1996) are said to be more significant. This section intends to examine the impact of these factors on the cost of knowledge transfer.

Ideally, transfer cost should be measured in simple value terms. Unfortunately, due to the fact that knowledge transfer is a process that concerns nearly every department of a firm, it is not possible for firms to come up with a clear number on the amount of money spent on this process. We can only roughly estimate the scale of the cost involved from the following indicators:

(1) the length of localisation programmes in these firms;

(2) the training programmes involved (in both headquarters and affiliate and those for suppliers);

(3) the expatriates sent to the affiliates;

(4) the specific teams set up co-ordinating knowledge transfer in both parent and affiliate.

A table indicating the cost elements incurred in these respects by the four firms in the knowledge transfer process was compiled, as below:

Table 6-7: The transfer cost elements of the four firms

	Motorola	Shanghai Bell	Shanghai VW	Beijing Jeep
Length (years to reach 80% localisation rate)	n/a	not yet	9	11
Training Programmes				
--headquarters	✓	✓	✓	✓
--affiliate	✓	✓	✓	✓
--suppliers	✓	✓	✓	✓
Expatriates Sent	✓	✓	✓	✓
Transfer Team	✓	✓	✓	✓

From this table, it is clear that very little difference has been found among these four firms in terms of the scale concerning the knowledge transfer cost. Indeed, not a single interviewee of the four firms could come up with a clear idea of how much has been spent on any one item of the list in the above table [although the direct cost of sending expatriates to subsidiaries, including salary, international travel cost, local accommodation and transport, allowance and so on, could be measured if access was given to the financial details of the foreign parents]. Instead, they used words like "very expensive", "substantial", "a large sum", "huge amount of resources" and so on, to describe their financial input in the knowledge transfer process. This is an indication of the complexity and volume of the knowledge involved.

Financial resources invested are not the only factors that decide transfer cost. The tacitness of the transferred knowledge also matters. Unlocking (decoding) the tacitness of the knowledge transferred (a process of articulation) takes time, requiring experts to deliver. Various training programmes run by each of these firms have been part of the efforts to make tacit knowledge accessible to employees in the affiliates in the Chinese market. These have increased the cost of both the foreign

parent and the Chinese affiliate. This supports the argument made by Kogut and Zander (1993) that tacitness increases the costs of transfer, and renders obsolete Hymer's (1960, 1976) view that the transference of the firm's advantage abroad via FDI is at "a marginal cost close to zero" (ibid.: 219), as discussed in Chapter 2. The marginal cost of knowledge transfer in the four firms is significantly different from zero in all cases, and the average cost is perceived to be large. It is quite probable that marginal cost declines with increasing output (of the affiliate). However, even in the case of upgrades, marginal cost is reported to be decidedly non-zero.

Moreover, the absorptive capacity of the recipient affects the total cost in carrying out knowledge transfer as well. Among the factors that relate to absorptive capacity, previous experience of knowledge transfer is very important (Teece, 1977). All the four firms in this research have engaged in the transfer of some substantially complex knowledge. However, none of them, except Beijing Jeep (where the initial technology and management systems were entirely brought in to China from then Soviet Union in 1950s), have had any previous experience on knowledge transfer[34]. While the transfer cost in each of them has been very high, we cannot find adequate evidence to support that the previous experience about knowledge transfer can decrease the total transfer cost. The reason may lie in the fact that the product ranges involved are so diverse that prior knowledge transfer experience just does not help to close the knowledge gap in new knowledge transfers. Whatever the role of prior knowledge transfer experience in affecting knowledge transfer cost is, it needs to be further studied at in future research in this area.

[34] Motorola (China) and Shanghai Bell were newly established firms, and Shanghai VW was set up with an existing firm which had been entirely dependent on its own R&D.

Absorptive capability as a whole does have some influence on the transfer cost. The two firms with established Chinese partners, Shanghai VW and Beijing Jeep, did not spend much less in terms of the scale of the transfer cost, than the two telecom firms (which were set up through green field investment), as might be expected, based on their prior absorptive capability. However, absorptive capability has been identified as a key factor in affecting knowledge transfer costs, and has been cultivated by all the firms concerned in various ways. We will deal with absorptive capability in more details in later sections on knowledge utilisation and organisational learning.

The transfer of management skills and social knowledge, which can enable the recipient to decode the tacitness and complexity of the knowledge transferred, does help to facilitate the transfer and utilisation of new technology, therefore decreasing the transfer cost. This has been very palpable in the case of Motorola, where one corporate culture and similar social knowledge has made the transfer process less problematic. The other point worth mentioning in relation to knowledge transfer cost is that, in dynamic terms, transfer cost could be decreasing when the production volume of the firm concerned is increasing. This has been indicated by the interviewees in the parent firm Alcatel Bell:

> The size of production does matter in terms of decreasing transfer cost. If the production volume were huge, then the transfer cost would be (comparatively) low.

This does make sense if one interprets transfer cost as "average transfer cost". The cost of knowledge transfer becomes an outstanding issue, especially in the initial

stage of technology-orientated joint ventures. Large volume of affiliate production can provide the financial resources needed to implement the knowledge transfer strategy, thus alleviating the cost of the process.

Our investigation reveals that the other way of reducing some of the knowledge transfer costs is to gain access, through venture partners, to skilled labour and software institutions, such as quasi-government at R&D organisations and autonomous state-funded multidisciplinary research institutes (Afriyie, 1988). As discussed in the next chapter on overcoming language problems (which are only part of the costs incurred in the knowledge transfer process) all the four firms have been very active in recruiting new graduates from key universities and, at the same time, attracting experienced engineers and managers from other, usually state-owned, firms. This is a common way of nurturing absorptive capacity at the recipient site. In the extreme case, in order to recruit some of the most wanted engineers in telecommunications equipment design and production from other state-owned firms, Shanghai Bell secured a preferential policy from the central and Shanghai local governments, which ensured that all the new recruits would be allowed to register as a full resident of Shanghai under the rigid Chinese household registration system. This provided a great incentive to those seeking to move into the business centre of China. It clearly demonstrates the importance of government intervention in creating the right environment for FDI in a socialist market economy, as discussed in Section "3.2 Features of the Chinese business environment" in Chapter 3. The above case also confirms the argument by Roehrig (1994) that establishing a good relationship

with government is one of the most important strategies for Sino-foreign joint ventures.

Partnering with various R&D organisations in China further reduced the knowledge transfer costs of these firms. Shanghai Bell set up a strong link with R&D institutions of the Ministry of Post and Telecommunications (MPT), and with key universities with substantial engineering capability. Beijing Jeep established a localisation community that includes government R&D institutions as well as university laboratories. In the case of Motorola, partnering with various R&D institutions has become a basic business strategy in its China operations. Up to now, it has opened six joint R&D centres with several elite universities in Beijing and Tianjin. Its cooperation with local producers has also concentrated on the sharing of information and knowledge developed from joint research projects. These have certainly minimised the knowledge transfer costs of these incoming firms and strengthened their R&D capability in the challenging Chinese market.

6.5 Summary

This chapter has dealt with the first two research questions set out in this research, i.e., what knowledge has been transferred into the Chinese market through FDI and how has the knowledge been transferred? It has done this by examining the practices of knowledge transfer carried out by four multinational firms in the Chinese telecommunications equipment industry and the automotive industry. This has been

conducted by closely following the relating discussions in Chapter 2, as demonstrated in the following table:

Table 6-8: Correspondence of Literature Review and Analytical Chapters.

Literature Review	Analytical Chapter	
Section 2.1-2.4	***Chapter 6***	***First two research questions***
2.1 Introduction	6.1 Introduction	
2.2 Knowledge transfer and international business		
2.3 Knowledge transferred by FDI	6.2 The context prior to knowledge transfer	
2. 31 The classic motives for FDI	6.21 The strategic motives of MNCs in entering the Chinese market 6.22 Entry mode 6.23 Corporate governance	
2.32 The characteristics of the transferred knowledge in the context of FDI	6.3 The knowledge that has been transferred by FDI 6.31 The typology of the transferred knowledge	Question No. 1: what knowledge has been transferred
2.33 The characteristics of knowledge transferred at different stages	6.32 The stages characteristic of transferred knowledge	
2.4 The way of transferring knowledge by FDI	6.4 The way of handling knowledge transfer	Question No. 2: how has knowledge been transferred
2.41 The choice of transfer mode	6.41 The choice of knowledge transfer mode	
2.42 The execution of knowledge transfer	6.42 The execution of knowledge transfer	
2.43 The cost of knowledge transfer	6.43 Knowledge transfer cost	
	6.5 Summary	

Before tackling these two questions themselves, some relevant issues in relation to FDI carried out by these four firms were examined. Based on extensive

investigations, it reveals that the strategic motives for FDI within these two industries in entering the Chinese market is primarily local market servicing and the rents that accrue from the transfer of knowledge to the dominant suppliers of this market (i.e., the foreign investors' affiliates). The point here for the foreign invested firms is how to secure a favourable environment from the host market by making an optimal strategic decision on entry mode, irrespective of which industry they are in or which country they come from. Three out of the four firms chose joint venture as their entry mode, reflecting the restrictions imposed by the Chinese government in the 1980s on the one hand, on the other hand, the nature of risk in the Chinese market and the need for a Chinese partner to negotiate the local environment. A clear indication of the purpose of Chinese firms in engaging in joint ventures can be found in the product selection stage, where only the most advanced products are expected to be introduced. The leading criteria in selecting foreign partners by local Chinese firms are the strategic assets held by the foreign firm, such as technological advantages, financial resources, and management skills (although the importance of the last is often only fully realised later). Foreign partners, on the other hand, seek to limit the "bleedthrough" of their input knowledge by way of designing the structure of corporate governance to achieve a division of management control within the firms concerned that preserves the value of their ownership advantages.

In respect of the characteristics of the transferred knowledge, it has been confirmed that the transferred knowledge includes not only the commonly recognised technology and management skills, but also social knowledge which helps to shape the vision and atmosphere of the affiliate. Motivated by the prospect of expanded

market size and enhanced market growth, some (offensive) foreign direct investments are more likely to transfer knowledge appropriate to a broader range of functions than just production related technologies. The knowledge transferred to the three joint venture affiliates in the Chinese market has been found to have stages characteristics. Our investigation shows that the firms actually transferred the different types of knowledge at different stages, even though some of them intended to carry out the transfer of different knowledge simultaneously.

There have been some illuminating findings regarding the way of transferring the knowledge within MNCs into the Chinese telecommunications manufacturing sector and its automotive industry. It is evident that the more tacit the knowledge concerned is, in terms of codifiability and teachability, the more likely it is to be transferred across national boundaries to a wholly-owned subsidiary (where permissible) than through a joint venture. Foreign parents usually send expatriates to their affiliates in the Chinese market to ensure that the recipient company can acquire and utilise the transferred knowledge much more effectively due to the availability of foreign expertise on site. A key finding is that the volume of knowledge transfer (i.e., including management skills and social knowledge) is dependent on both the knowledge gap between foreign parents and their joint venture affiliates, and the competitive strategy of the parent firms in the host market. Knowledge flows from the parent to the affiliate might be increased to include the latest technological and managerial expertise if the affiliate faces declining market power (i.e., increasing market competition). The cost of knowledge transfer in the Chinese market is influenced by the complexity and tacitness of the transferred knowledge, the

financial and human resources committed by the parents, and the absorptive capacity of affiliates in the host market. This is a confirmation of the relevant studies conducted in developed economies, but with emphasis on the complementarity of management skills and social knowledge in order to better effect the required radical change compared with the Chinese norms.

Though different in terms of technological sophistication, we can conclude that the common themes for the four firms in this research with respect to knowledge transfer are: how to secure the most favourable environment in the host market by making a well-judged strategic decision on entry mode, irrespective of industry or country of origin, that can enable them to secure the desired market share based on their existing technologies; and how to carry out the transfer of the chosen technologies, managerial skills and social knowledge to their affiliates in the most efficient mode, to establish the competitiveness of these affiliates in the Chinese market without surrendering too much of their proprietary assets or incurring higher cost.

There are some significant differences between the affiliates as well: apart from "choosing" different entry modes (joint venture vs wholly-owned subsidiary), they selected products of different levels; the Chinese Communist Party operates its command structure in the joint ventures influencing decision making processes, but not in the wholly-owned subsidiaries; knowledge in more than one line of business was transferred to the wholly-owned subsidiary while, in the case of joint ventures, usually knowledge of only one line of business was transferred; there are a stages

characteristics found for the transferred knowledge among the three joint ventures, but not the wholly-owned subsidiary; and these three joint ventures all subsequently transferred more types of knowledge than were originally negotiated. In addition, regarding the way the knowledge transfer was handled, different knowledge transfer modes were employed by the four firms. The firms all deployed expatriates to facilitate knowledge transfer, however, those expatriates in the joint ventures were also expected to guard against any possibility of the leaking of intellectual property owned by the parents.

There are also some differences between the two industries. The most important one is that the latest technologies have been brought in by the foreign investors in the telecommunications manufacturing industry where the fast pace of technological advancement has characterised the industry. However, in the automotive industry, only modest (very mature) technologies have been transferred to China. The volume of the transferred knowledge between the two industries appears different too: the volume transferred in the telecommunications manufacturing industry has been much greater than in the automotive industry. The other difference found between them is that labour cost does have some significance in the investment decision of the automotive industry, and China can provide a locational attraction especially in this respect on account of its internationally low real wage costs. However, in the case of the telecommunications manufacturing industry, the proportion of labour costs in total cost is too low for this to materially affect the investment decision.

Is China different from other transitional economies? Based on the limited research conducted on Central and Eastern Europe in respect of FDI and knowledge transfer, there is one difference emerging in respect of the different technological capability between China and these countries. When compared with China, the transitional economies of Central and Eastern Europe boast more advanced technologies and production skills within their respective manufacturing industries. As a result, while Chinese partners have always sought to start by transferring the hard elements of technology, firms in the transitional economies of Europe have more often prioritised the soft elements of knowledge on their transfer lists. However, this does not contradict the commonality between China and these countries that foreign firms with resources that can be used by the local partners to create their own competitive advantages were encouraged to move into strategic industries through joint venture mode (Hooley, *et al*, 1996).

These findings have some theoretical implications. Firstly, knowledge should be viewed as a complete set rather than the substitution of technology alone, or technology with some management skills. The contents of knowledge are much wider than technology as traditionally envisaged, and each of the three types of knowledge, i.e., technology, management skills and social culture, should be neither overestimated nor ignored. In fact, each contributes to the successful production and delivery of the transferred product and the competitiveness of the firm in general in the transitional markets. The customary technology-centred view should be rebalanced to reflect the unique value and inseparable contribution by management

skills and, in particular, social knowledge in enabling the business operation of the newly established affiliate.

Secondly, we find that the volume of knowledge transfer is strongly influenced by both the knowledge gap between foreign parents and their joint venture affiliates, and the competitive strategy of the parent firms in the host market. In fact, knowledge transfer is an on-going process of great complexity rather than a static, pre-set, carefully-planned, journey. MNCs adapted to the changing market situation by committing more of their resources than planned. The key to success in a potentially huge market such as China's is in strategic judgement instead of accounting judgement, i.e., seeking long-term strategic presence and the overall financial return from it instead of short-term net gain.

Thirdly, considerations of the host business environment were highly placed and incorporated into the process of choosing a market entry strategy by MNCs. While it was likely to be preferred to adopt the wholly-owned subsidiary mode in order to enter foreign markets in knowledge-intensive industries (such as the telecommunications manufacturing industry and the automotive industry), the joint venture was used as leverage to seek substantial government support. This is due to the host governments' preference for facilitating knowledge transfer to and the nurturing of indigenous industries. Therefore, whether to choose a wholly-owned subsidiary or joint venture is not a simple comparison of their own merits but a cost-benefit analysis of MNCs' negotiation with the host government. When the joint venture route has been chosen as the entry mode, MNCs must deliberate on how to

safeguard their proprietary assets from 'leaking' or dissipation. Because, in most cases, especially when the foreign side holds a minority equity in the joint venture, it can gain greater influence over the business operations of the joint venture by controlling the knowledge transfer – in the form of the knowledge transfer mode, knowledge transfer volume and knowledge transfer rate. While aspects of knowledge transfer are agreed in advance, the controlling ability to accelerate the transfer rests entirely with the foreign partner, thus improving its bargaining power.

Chapter 7 From knowledge transfer to organisational learning: Knowledge utilisation by FDI in China's telecommunications manufacturing industry and automotive industry

7.1 Introduction

The objective of this chapter is to address the remaining two research questions set out for this research, i.e., How has the transferred knowledge been utilised? And, what's the impact of the Chinese business environment on MNCs' knowledge transfer? Knowledge utilisation is the main part of the knowledge transfer process addressed in this study. This chapter is intended to examine the process of knowledge utilisation in the recipient firms from an organisational learning perspective. The common themes among the four firms of this investigation are: (1) how to carry out organisational learning effectively to achieve an improved and sustainable firm performances in the Chinese market; (2) how to deal with the environmental uncertainties presented by the host market in the organisational learning process; and (3) how to adapt appropriately to the local culture. To address these, this chapter first examines the different stages of the organisational learning process (including the secondary knowledge transfer carried out in the four firms in the Chinese market), followed by an analysis of the key factors in this organisational learning process and a discussion of the impact of the Chinese business environment on knowledge transfer and organisational learning. Finally, this chapter compares the

results of knowledge transfer in the four firms chosen, i.e., the impact of knowledge transfer and organisational learning on the competitiveness of these firms.

7.2 The process of organisational learning

7.21 The process of organisational learning: An overview

The current literature suggests that organisational learning is essential to maintain firm competitiveness. It is composed of three main stages: articulation, application and dissemination (Hedlund and Nonaka, 1993, which is discussed in Section "2.52 The process of organisational learning"). This section will look at these issues in the Chinese context.

The interview data of these four firms confirm that knowledge transfer and utilisation is in essence a learning process carried out in the recipient firm.

> Knowledge transfer is actually a process of active learning and hard working. That's the secret of our success in transferring knowledge from VW and as a result of that learning process, now we are the No. 1 in car production in China.
>
> (Mr Cheng Gang, Shanghai VW)

> We learnt a lot in the process of making this joint venture work. Don't forget that we had had no idea at all about joint venture before entering into this firm. To maintain this firm in a proper working order, numerous things needed to be grasped, from technology, manufacturing, quality control, to marketing, human resources management, and so on. They [western firms] have extensive knowledge on how to run a firm competitively, especially in a time when the economy has been increasingly internationalised, we must learn (otherwise we have no chance of survival). Each employee of this firm learned continuously and so we are successful today. I hope our state-owned firms can learn [from western firms] as well, and try to learn fast.
>
> (Mr Zheng Yulu, Shanghai Bell)

It seems clear that these two firms have realised that learning is the key to their current success. Without extensive learning firms cannot generate and maintain competitiveness even in the Chinese market. Motorola (China) and Beijing Jeep are no exception. The fact of Motorola University's active role in facilitating learning within Motorola (China), and the establishment of "Beijing Jeep's Localisation Community" - in addition to various training programmes in Beijing Jeep - signifies that organisational learning has been considered an inseparable part of their business operations. This is in line with the argument made by Edmondson and Moingeon (1998) that organisational learning is an essential adjunct to maintaining competitive advantage. It also supports the view that organisational learning contributes significantly to IJV performance (Hamel, 1991; Hamel, Doz and Prahalad, 1989; Kogut and Zander, 1992; Lyles and Baird, 1994; Lyles and Schwenk, 1992).

Generally, this research confirms the organisational learning process proposed by Hedlund and Nonaka (1993: 126), which includes: gaining new knowledge – articulation – application – dissemination and expansion, is applicable to China's telecommunications manufacturing industry and automobile industry. For example, in the case of Beijing Jeep, the process of organisational learning was described as:

> First, translating all the documents, digesting and assimilating the technical documents, choosing and training qualified workers, equipment installation and adjusting; second, beginning production, direct application of the technical directory, technical criteria, technical upgrading information, and some changes need to be made at this stage, such as the transformation from the USA weights and measures system to the metric system, the reorganisation of manufacturing engineering due to the differences of production equipment in the two firms concerned, and the reproduction of the blueprints (with some mistakes or unclear numbering of the pages and so on); third, utilisation with certain refining and renovation. This has been carried out especially in the area

of adjusting the product concerned to the environmental and traffic conditions of China.

(Mr Tong Zhiyuan, Beijing Jeep)

We can see that the process in Beijing Jeep exactly matches that envisaged by Hedlund and Nonaka (*ibid.*). In the telecommunications manufacturing industry, few differences have been found from this model. For example, the general knowledge transfer and organisational learning process in Shanghai Bell, according to Mr Zheng Yulu, its production manager, is: gaining knowledge, digesting, localisation, joint development and self-development.

When compared with Shanghai Bell's model, we can see that the process of organisational learning in Beijing Jeep does not emphasise the R&D aspect, which is an essential part of strengthening firm's competitiveness, as will be discussed in the later section. This reflects the strategic weakness of Beijing Jeep in handling knowledge transfer, which partly contributed to the lower efficiency in its operation and fewer successes in market competition. In contrast, Shanghai VW has always been conscious of the imperative of R&D capability development in the process of knowledge transfer and organisational learning. This was clearly stated by an interviewee, Mr Cheng Gang, on Shanghai VW's stages of knowledge utilisation:

> Our main weakness is R&D capability. That's why we had to transfer in foreign knowledge. When the technology is transferred, assimilation (digesting) and production localisation is the first stage. The second stage is joint R&D on the new products. In this case, we also contributed to the new products. We are now in the later part of this stage. In the third stage, we will be able to contribute more than half of the new products developed. That means we will be dominant or in a leading position in the R&D development. The last stage is independent R&D. In that case we will be able to develop new products on our own.

> In the first stage, we can have sub-stages. First, copying everything from our partner, even mistakes. Then, when we have accumulated certain knowledge about the transferred products, we solved the problems occurred in the localisation process (one way of doing this is perfecting, i.e., making the products flawless, the other way is modification, i.e., making them meeting the circumstances of China). That indicates that we have a bigger say in the transfer process.

The Shanghai VW case indicates that firms in China can still build into the agenda the improvement of their own R&D capabilities in the process of utilising the transferred knowledge and organisational learning. An emphasis on this will make a big difference in terms of competitiveness over several years. The following sections will look into the organisational learning processes of these four firms in more detail, employing the stages model proposed by Hedlund and Nonaka (ibid.).

7.22 Articulation

Articulation is the crucial stage in the whole organisational learning process for understanding, testing and sharing the knowledge transferred (Hedlund and Nonaka, 1993:126), as illustrated in Section "2.52 The process of organisational learning". This aspect has received extensive attention in the four firms investigated. This results partly from the fact that the difference of languages has been the primary barrier in the assimilation of the transferred knowledge, although generally the Chinese management team and engineers have a good command of the foreign language the foreign partner uses[35]. German is used in the case of Shanghai VW

[35] Generally managers and engineers need to demonstrate their language capability in the recruitment process, e.g. pass certain examinations in reading, speaking and writing of the designated foreign language in the joint venture, , unless they are graduates in the foreign language. In-house training continues after they have taken up their posts. Language capability is taken into consideration in terms of promotion or opportunities of assignments in overseas countries, such as conducting joint research or receiving training in the headquarters of the foreign partner.

(English is also used at work place, but not so predominant as German), and English in the remaining three. The level of understanding and command of the foreign language among workshop workers is never higher than the basic level. This strictly requires the provision of technical and management materials, based on the transferred knowledge, in a Chinese version so that the people on production line can grasp the advanced knowledge from the foreign parent to the degree expected. For this purpose, translation centres and document centres were set up in the three joint ventures. For example, there is a translation group in Shanghai Bell, which, after screening and selecting all the transferred document, translates those materials required or needed into Chinese and sends them to the relevant departments. This has ensured that the transferred knowledge from Alcatel Bell was correctly categorised, analysed and distributed.

Being aware of the impact of the language problem on the organisational learning process, all the firms in this research have been tackling it from early in the recruitment stage. University graduates with a good command of foreign language, usually English, which is the most popular one among foreign languages, have been attracted to these firms by better pay and fashionable social facilities. In the case of Shanghai VW, because German is the main working language in the firm, but very few institutions provide it as an option for non-language students, Shanghai VW has to recruit: (1) students from Tongji University of Shanghai, which is an engineering institution that also specialises in German training; (2) some students of foreign language disciplines; and (3) students with fluent English. Based on the fact that most German mangers can speak good English, English has become a second

working language between German expatriates and Chinese employees, though most of the documents are in German with the exception of some publicity materials. The other way of tackling the language problem is by providing workers with some language training as part of the general training programme.

> All the staff sent to Germany for training programmes have all been examined in their German proficiency. Only once having passed language examinations can people be sent away. So, we set up a German training centre in SVW to deal with this issue. Secondly, we employed lots of graduates of Tongji University where, unlike other institutions, German is the first foreign language taught. This has saved us lots of time and money. In general most of our staff understand either German or English while most of the German experts can speak English. German and English are both our communication languages.
>
> (Mr Cheng Gang, Shanghai VW)

Based on the approach outlined above, it appears that no great difficulties have been caused due to the difference of languages in the process of knowledge transfer and utilisation. This is consistent with the findings of other similar research carried out on joint ventures in China, e.g., Harding (1999). However, our findings differ from those of some studies with cases based on MNCs in other parts of the world, e.g., Marschan (1996), who finds that the lack of language skills obstructed the effective inter-unit communication flows within the same MNC (*ibid.*, p. 152). Our finding may be due to the fact that English was designated as the primary foreign language in secondary schools as early as 1978, as part of the drive of opening China to the outside world. As a result, there is a great supply of graduates with a good command of English. Joint ventures and other foreign invested firms have attracted plenty of such graduates since the 1980s based on better pay, more opportunities for international assignments, and an enviable image. Stringent recruitment requirements of language capabilities and continuous in-house training have enabled

the managers and engineers in the four firms of this research to carry out communications in English effectively (or German in the case of Shanghai VW). In the case of Shanghai Bell, English is the main working language, although Flemish is the mother tongue of the Belgian expatriates. All the transferred materials are in English. All the engineers and managers can use English as a working language. They are easily able to read and digest English documentation directly. It is also possible that the supply of English-speaking Chinese is not a binding constraint owning to the scale of China. It may become a binding constraint as inward FDI rises in the future.

In contrast with the joint ventures, there is no comparable documentation or translation centre in Motorola (China). Instead Motorola (China) overcomes language problems through concerted recruitment and training programmes. Firstly, proficiency of English has been a primary selection criterion for all the managerial staff, engineers and technicians, as the working language in the firm is English (though in practice Chinese has been used between the Chinese staff most of the time). These staff must demonstrate a good command of English, i.e., must be able to use English fluently in the workplace, before an employment contract can be signed. A certain standard of command of English has also been asked of applicants who applied for jobs in the production workshop. Secondly, Chinese workshop employees undergo technical training in both English and Chinese, given by American and Chinese engineers and technicians, before starting their jobs, then further training continues to improve their production skills as well as language capabilities. Chinese managerial staff, engineers and other employees in non-

production departments are required to attend in-house training courses on a frequent basis, in which English is the only language used. Therefore, language differences have not caused serious problems in this wholly-owned subsidiary of Motorola, on account of its integrated approach of tackling the language issues.

If we can draw any conclusions from the approaches taken by the three joint ventures and Motorola (China), it is that they all addressed language issues from day one. This is a clear indication of the importance attached to language, as a means of facilitating knowledge transfer and organisational learning within these firms. Some differences between Motorola (China) and the joint ventures exist as well. Motorola (China) has the full authority in addressing language issues, while the other firms in joint venture partnerships had to go through rounds of discussion and co-ordination to achieve a compromised action plan. One piece of evidence is that there have been more frequent personnel exchanges taking place in this wholly-owned subsidiary where the cost was paid by both the headquarters and the subsidiary together, than in joint ventures where the local affiliate had to pay every penny arising from the visits by expatriates and Chinese employees in both directions. Frequent personnel exchanges enabled the Chinese employees to be exposed to the foreign language and cultural environment more thoroughly, promoting learning effectiveness. Moreover, the key role played by Motorola University in dealing with language issues within Motorola has demonstrated the different approaches with that of joint ventures at institutional level. So, the main factor that differentiates Motorola (China) from the other three firms has been that this company has had total authority to apply its own strategy in dealing with issues in this aspect.

The difference of languages is only part of the picture concerning articulation. The understanding and "externalisation", as put it by Nonaka and Takeuchi (1995: 64), of technical terminology, the difference in operation norms and practices, and the managerial requirements for carrying out the introduced manufacturing, all fall into the range of issues relating to articulation. Great attention has been paid by these firms to sort them out between Chinese and foreign engineering and managerial staff. Language differences, however, were singled out as the biggest concern among the management teams of these four firms, and extensive resources have been put in place to deal with it. The above analysis indicates that the firms concerned have successfully managed this issue.

7.23 Application

Application is the stage where the recipient firms can benefit from making use of the transferred knowledge in the business operations of the firms concerned in the Chinese market. According to the information collected, this stage can be divided into the following sections: training, copying and adaptation.

Training

Training is regarded as the first step of the application stage because it provides the staff of the recipient companies with capabilities to understand, exploit and adapt the transferred technologies, and equips them with management expertise and

international business practices. Training has been specifically related to Nonaka and Takeuchi (1995)'s notion of internalisation, which in the contest of IJVs means employees take explicit knowledge from the parent and converting it into tacit knowledge of their own. The following accounts are descriptions of training programmes in the two automotive firms, which support the above argument:

> Training has been regarded as a key aspect of knowledge transfer and the upgrading of competitiveness. Chrysler proposed in 1987, in addition to the training programmes already agreed, to set up a new training foundation by investing the tax rebate gained by the two partners of Beijing Jeep (RMB 2.5 million yuan, about US$470,000 then at US$1 = RMB 5.3 yuan) in establishing a new training centre in Beijing Jeep and paying for some of the trainees to visit the USA. Training programmes include: (1) seminars; (2) professional short courses; (3) case analysis within workshops; (4) sending trainees to the USA (including paying some of them to attend degree courses in American universities).
>
> (Mr Zhao Nailin, Beijing Jeep)

> Training in Shanghai VW has been dealt with in many ways, including sending managers and engineers to Germany, inviting German experts to SVW to run training programmes, the exchanging of information, and so on. Specifically, we require that unless he or she attends training programmes, a worker cannot be allowed to work on the production lines. Some of the workers were actually trained in Germany and spent some time working on the production line there.
>
> The length of training programmes in Germany varied from 3-4 months to 2 years, and differed from department to department. Engineers from R&D, moulding, and so on, usually spent two years in Germany; other engineering and technology-related staff spent one year there. For people from finance and accounting, materials management, purchasing and supply, marketing and after sales services, and other managerial departments, the time was usually less than half a year. In general most of the people sent to Germany were engineers and technicians, a minority of them was from managerial function departments. Management know-how has been transferred partly through this way and partly through learning from German managers in SVW.
>
> (Mr Cheng Gang, Shanghai VW)

In Motorola (China), in-house training programmes have been considered an important part of the task list of every employee. Motorola University, a dedicated internal training organisation, is in charge of the training issues of the entire

company. Here, training is seen as the key to transfer knowledge from its headquarters and established subsidiaries to those newly set up, and a principle way of transforming its affiliates to be world competitors. As it was put by one training officer:

> We have employed all the ways you mentioned in knowledge transfer. But, the most important one is training. Training is not for special people or in a special period, but for all the people all the time. I have never seen or heard of a large firm like Motorola committing so many resources, for example time, investment, specialised training system, in employees' training and continuous upgrading. Motorola University! What a fantastic idea! If you are not here you just cannot believe it.
>
> (Mr Liu, Motorola (China))

He emphasises that training in Motorola begins when an employee is recruited. Soon after arrival, he/she attends intensive training sessions concerning technical and cultural issues (such as the Motorola's corporate culture and communication skills for employees from different national cultures). Each employee will be presented with the potential opportunities ahead of him/her and the clear requirements affiliated, and a personal development ladder will be identified based on extensive consultation available from their head and human resources managers. This personal development plan will be reviewed every year according to the progress made in that period. This is to ensure that every employee will have the opportunity of fulfilling his/her aspiration along with Motorola's development.

Apart from the job-related training in the very beginning of one's employment in Motorola, each employee, including heads of the company, attends at least 40 hours' training each year arranged by training officers and Motorola University. In order to speed up the localisation process of Motorola (China)'s management team, a

specially designed programme, CAMP (China Accelerated Management Programme) was developed in 1994. It is an intensive, 10-month training programme that includes a two-month rotation overseas. This is in addition to dozens of other comprehensive training courses covering topics such as total customer satisfaction, reducing project cycle time, market research methodologies and advanced manufacturing technologies. In CAMP's first 3 years, 100 employees have participated in the programme directly relating to the transfer of management skills. This represents a large portion of their management team. The other main types of training provided by Motorola University are courses relating to total quality control, technology and marketing.

It is worth noting that the training provided inside Motorola is not only for its own employees, but also for people from its joint ventures, cooperative projects, and even its suppliers. This has obviously done a lot good in strengthening Motorola (China)'s competence.

A very similar picture of training can be found in Shanghai Bell. Notably, the training scheme not only covers the employees in Shanghai, but also those working in Shanghai Bell's affiliates:

> In our case, training is the main route of learning the management skills we need. We did attend many management (especially in marketing and customer services) training programmes organised in our headquarters Shanghai Bell. It is a requirement for us to attend. We also received lots of related materials from our parent on both management and, of course, technical issues, but closely linked to the products and operational arrangements of Shanghai Bell. Furthermore, the managers of Shanghai Bell's affiliates are under screening from our leaders in headquarters from time to time. They visit us sometime in a year just like we need to visit them by going to Shanghai.
>
> (Mr Zhou Feilong, NEAT)

Training also serves as a key channel for passing on the social knowledge (including corporate culture) of foreign parents, most of which is embedded inside people's minds, language and behaviour. In Shanghai Bell, social knowledge has been regarded as the "secret weapon" of their success (as noted in Section "6.31 The typology of the transferred knowledge"), and training is one of the ways of transferring this knowledge to different affiliates. Training programmes held in both Shanghai and Antwerp in Belgium, which have been taught by Belgian managers, are credited as being an effective way of injecting the belief, company-specific knowledge (internal jargon, management style, technical system, etc.) and corporate culture of Alcatel Bell to employees in its newly established affiliates. Shanghai VW also regards training as the process of equipping employees with VW's tradition of innovation and sense of quality. Perhaps, however, the most outstanding case is that of Motorola (China). Training there is served not only for learning the job-related technical knowledge, but also to transform employees mentally into Motorola people. This has been a key step in promoting the integration of Motorola's "Empire". All these facts strongly support our argument that transferring and sharing social knowledge is critical to keep the newly established affiliates competitive in a foreign market.

From the above analysis, it is clear that the four firms have all carried out substantial training programmes since their establishment. Training centres, with dedicated training facilities, were set up, and special training officers appointed. Every new employee in these firms has to participate in a well-designed training programme

and get qualified before being allowed to take up his/her job. Continuing training sessions have been followed to ensure the high level skills are maintained and enhanced, along with the upgrading of production facilities. Training sessions also have been used to equip affiliate employees with modern management skills and pass on social knowledge. Even when primary knowledge transfer[36] has been finished, as shown in the above interview data, some training programmes still go on in these four firms to update the technical and managerial knowledge of employees, and to consolidate their competitiveness in a changing market. This is in line with the argument of Nonaka and Takeuchi (1995) in achieving internalisation within MNCs, which is an important part of organisational learning.

In comparison, training in Motorola (China) is more systematic and intensive than in its joint venture counterparts. This is essentially a reflection of the different beliefs between them. Motorola regards training as part of its firm competitiveness, with Motorola University at the centre of its corporate identity, while all the joint ventures use training to achieve their respective firm competitiveness. This resulted in more investment in training, more appointment of training officers and more extensive personnel exchanges with its headquarters by Motorola (China). Joint ventures, on the other hand, have to go through a process to reach a consensus on training issues. Investment in this respect therefore depends on the consensus of the parties involved, as well as on the business operation results. In the joint ventures, training has always been in danger of being treated lightly, or even ignored when the affiliate is in difficulties.

[36] The transfer of the knowledge defined in the joint venture contract, usually the technologies for producing a certain product.

It also transpires that the two firms in the telecommunications equipment industry seem to emphasise training more as a way of strengthening the firm's general competitiveness than the two in the automotive industry. This may be an industry-specific difference in the native of the two industries. Shanghai VW and Beijing Jeep contrast in that relatively fewer training programmes have been provided, and there is a concentration towards pre-employment training. In comparison, more frequent and intensive post-employment training programmes have been arranged in Shanghai Bell and Motorola (China). This may be a clear indication of the fast pace of technological innovation and fierce competition characterising in the telecommunications industry since the 1980s.

Copying

Copying is the second step of the application stage. It is a process of reassembling the business operations in the Chinese affiliate based on the blueprints of the foreign parent. This involves not only the direct application of all the transferred technologies (product design, manufacturing process, product testing and quality control), but also the active employment of management skills (marketing, accounting and finance, planning, purchasing and supply, stock control, etc.) that are vital to the proper functioning of the firm. The aim is to achieve the 'cloning' in the affiliate of the existing production of a product from the foreign parent. The current literature has failed to identify copying as an independent step within the stage of application. However, as discussed in Chapter 2, absorptive capacity and the creation

of teams are thought to be of primary importance to facilitate organisational learning in general. This section intends to review their roles within the context of copying.

The general copying process has been very similar among the four firms concerned. After signing the contract, an action plan was agreed either by the joint venture parties or the headquarters (in the case of Motorola), and a flow of technical materials began from the foreign parent to the affiliate in the Chinese market, with blueprints for building up a workshop and for installing the production line for the specific product. A key finding from this research is that the success of copying depends on two things: one is the absorptive capacity of the recipient and the other one is the employment of teams. This confirms our previous discussion in Section "2.51 The utilisation of the transferred knowledge: An organisational learning perspective" of Chapter 2.

Absorptive capacity has been considered as one of the most important factors that determine the effectiveness of technology transfer (e.g., Cohen and Levinthal, 1990). A study by Li and Shenkar (1996) reveals that existing local partner skills largely determine the types of skills sought from foreign partners. In other words, the transfer of a foreign firm's technology, management and marketing skills will be less successful if the local affiliate does not possess the necessary skill base. Beijing Jeep's experience strongly supports this argument. The Board of Directors of Beijing Jeep, on 14th October 1984, decided to achieve a localisation rate of 80 per cent by 1987, three years after its establishment. Due to the technical gap between the joint venture and its local suppliers, and that of foreign parent, it transpired that this

objective was too ambitious. It was achieved only in 1994, ten years after its establishment. The data show that the technology transfer process in Beijing Jeep has been obstructed by two factors, and one of them is the weak absorptive capacity (the other one is the cost factor[37]). In fact, the American partner has always been very active in facilitating the transfer of advanced technologies according to the joint venture contract. The slow speed of technology transfer in this firm was largely due to the inability of the recipient to absorb the transferred elements on time. In order to raise the efficiency of utilising the transferred technologies, Beijing Jeep had to make slower the technology flow in order to cope with the task of digestion and localisation.

It would be true to say that the strategy of transferring the latest technologies and fast localisation was based on the exigencies of the Chinese government, and not on the technological and manufacturing capability of the Chinese industry. From the data collected in this investigation we can see that the Chinese partners perceived the introduction of FDI as an opportunity to inject new life into the firms concerned. Restricted in their knowledge about the challenges to the new products to be introduced in the technical and production dimensions, the Chinese partners seemed very confident of the availability of local suppliers and of their own technological capability to assimilate the new technologies. The Chinese perception was that market demand, competitive strategy and government policies would decide their future positions in the Chinese market, rather than the firms' technical and

[37] According to Zhang, P. (1995), a sample of 20 localised products indicated that their cost on average was 1.4 times of those imported which was composed of: manufacturer selling price + packaging + sea transportation + tariff + unloading at the port + surface transportation.

production limitations. Owing to the long term segregation from the world economy, Chinese firms in general, and those of telecommunications and automotive industries in particular, were largely thirty years behind their counterparts in the advanced industrial countries in terms of technological capability and management skills. The local component producers' perceptions were even more at variance with their own abilities. Due to the discriminatory Chinese industrial policies, state-owned, large firms were treated preferentially in terms of raw materials, capital and human resources allocation, while the collectively-owned, medium and small firms were forced to take care of themselves, under the central planning regime. For this reason, component producers tended to overestimate their abilities, and as a result were slow in meeting their targets in technology assimilation, localisation, and the technical upgrading of their existing line of business. Hence, while external factors such as market demand, competitive strategy, the intention of upgrading the existing range of products and government policy, drove these firms to choose the most advanced products and quick localisation for the joint ventures concerned, internal constraints such as technological capability, management skills and the availability of local suppliers, paralysed the production plans for the chosen products in the first stage of each joint venture. It is fair to say that the lack of fine judgement of the self-technical and management capabilities, and those of component suppliers, in the product selection process, has contributed to the low efficiency of technology transfer and utilisation in the joint ventures concerned. Beijing Jeep's experience directly supports the argument that the absence of an appropriate skills base and absorptive capacity in an affiliate represents a severe barrier to knowledge transfer (Li and Shenkar, 1996; Quelin, 1998). Therefore, in a newly established firm, the

building up of the absorptive capacity is essential to the utilisation of the transferred knowledge. However, slowing the transfer rate begs the question of whether training needed to be increased, to raise absorptive capacity in the long term.

Being aware of its importance, Shanghai Bell paid great attention to strengthening its absorptive capacity: inviting many mature experts to take part in the utilisation process, recruiting hundreds of young graduates in majors such as telecommunications systems, engineering, production and software development, holding training programmes in both Belgium and China. It also involved sending trainees to Belgian Bell's production line and R&D centre to gain a thorough understanding and grasp of the production process, and receiving expatriates from Belgian Bell to head the relevant departments and groups on assimilation and application of the transferred knowledge. Shanghai Bell has developed a very experienced team in knowledge absorption and utilisation, which has been referred to as the most important asset of this firm by Ms Yin Linggu (of Shanghai Bell). Moreover, as an indication of strong absorptive capacity, Shanghai Bell now is in a position not only to be actively involved in the development of a new generation of System 1240, but also to pass on its own capability of utilising transferred knowledge as part of firm specific advantage to its new own affiliates in the Chinese market.

Shanghai Bell is not alone. The other three firms have also spared no efforts in improving their absorptive capabilities in ways similar to Shanghai Bell. Especially, we found that localisation committees were set up in all the three joint ventures of

this research to coordinate the absorption-localisation process in these firms and their major suppliers. In Beijing Jeep, a localisation community comprising component producers, research institutions and universities was established to tackle the problems found in the process of knowledge transfer and utilisation. The other interesting phenomenon we found is that joint design was regarded as an indication of strong absorptive capacity, and a necessary stage to go forward after the successful localisation of the transferred knowledge. Shanghai Bell has a R&D centre in Antwerp, participating in the development of next generation System 12; Shanghai VW jointly developed the second generation of Santana (Santana 2000) along with colleagues of VW in Germany and Brazil during 1992-1993. Santana 2000Gti was followed in 1997, and a much-advanced model is now in progress. Chinese engineers have played more and more important roles in this development process. Comparatively, Beijing Jeep has made fewer progresses in this regard, while Motorola is in a higher category altogether. In Motorola (China) absorptive capacity and R&D capability has been nourished together, but in different lines of products: while striving to establish its absorptive capacity in all the product technologies transferred, such as semiconductor products, microprocessor, cellular phone, pager, and so on, Motorola also established a software centre, a mobile telecommunications products development centre, a manufacturing technology research centre, and a paging research and development centre. All of these centres provide R&D services to all divisions of Motorola around the world. In general, our findings confirm that absorptive capacity was considered a key element in facilitating knowledge transfer. A clear understanding of the impact of the existing skills base on the effectiveness of knowledge transfer and organisational learning has

pushed the parties concerned to pursue the establishment of absorptive capacity from the recruitment stage towards joint R&D. This has been entirely consistent with the finding made by Szulanski (1997).

Team is the other factor to be considered crucial in knowledge transfer and organisational learning in general, and in the process of copying in particular. Team was even referred to as the single most important factor in facilitating the direct transfer of knowledge (Hedlund and Riddersaträle, 1994; Nonaka and Takeuchi, 1995). The complexity of transferring knowledge between firms is that a great volume of daily follow-ups are needed to maintain the momentum of the process, which have to be shouldered by the designated teams on each side of the transfer. Members of the team include not only engineers who are familiar with the technical aspects of the products concerned, but also managers who are empowered to co-ordinate the resources available for the purpose of transferring knowledge, communicate with higher levels in the hierarchies, and make decisions with given authority. Technicians and section chiefs of production line are also consulted regularly.

As the interview data show, first there is a team that is experienced in dealing with the knowledge transfer concerned in the headquarters of the parent firm, e.g., the Department of Knowledge Transfer in Alcatel Bell, the Department of International Operation in CMC and AMC, the knowledge transfer unit in the Department of Asia Pacific in Motorola, and the Overseas Coordination Division of VW. Each of these firms concerned has been engaged in international business for quite a long time, and

has in the past two decades internationalised further via licensing and via FDI, in the form of joint ventures and the setting up of wholly-owned subsidiaries around the world. Therefore, it is not surprising to see that the backup for knowledge transfer is strong and well organised. So, the advantage of these four firms in knowledge transfer lies in their expertise of supporting the transfer process, which has been embedded in an experienced team.

Second there is a dedicated team in the recipient firm. The transfer team in the Chinese affiliate usually consists of the departments such as product development, production, engineering and localisation, usually co-ordinated by the Knowledge Transfer and Localisation Office, as seen in Shanghai VW, Beijing Jeep and Shanghai Bell. But, as the deputy general manager of Beijing Jeep, Mr Zhao Nailin, put it:

> Knowledge transfer and utilisation is not the business of several departments or certain people, but the business of the whole firm. Every employee has to assimilate the transferred knowledge concerning his own job.

The information provided by Alcatel Bell's knowledge transfer team also reveals that they could deal with any department in the affiliate in order to oversee the progress of the knowledge transfer process.

Both partners in these firms recognise the important role of teams in facilitating knowledge transfer and utilisation, as demonstrated in the case of Shanghai Bell:

> The most important factor in knowledge utilisation is technical assistance. A special team is always in place to solve the problems arising from assimilating

> and applying the knowledge transferred. Alcatel Bell also has a technology transfer department specifically dealing with the daily follow-ups and to provide further assistance to its joint venture partners or licensees.
>
> (Mr Jos Caerts, Alcatel Bell)

> Technology transfer is really not easy to carry out. I have seen many unsuccessful cases of transferring technology. Why have so many failed while ours has been so successful? First and foremost, our partner, Belgian Bell is very experienced in technology transfer. There is a team inside it to facilitate the technology transfer process from the very beginning, dealing with numerous daily follow-ups.
>
> (Ms Yin Linggu, Shanghai Bell)

According to the interview data, the team of the recipient firm must be very competent and needs to take an active role in bridging the differences that emerge between parent and affiliate, and pass on the requirements and any disagreement to its counterpart in the parent firm. In the light of the importance of the transfer team in recipient firm, great efforts have been made by the recipient firms in China to build up high quality teams. Apart from external recruitment and internal selection, plus training programmes for local staff, expatriates from the parent firms have been kept longer in the recipient transfer teams so that the knowledge recipient can rely on the expertise of both Chinese and foreign staff to deal with issues in the transfer process more effectively. For example, Shanghai Bell still keeps 15 Belgian expatriates, Shanghai VW 10-15, and Beijing Jeep 9 American experts annually. It is also a way to promote learning by Chinese staff, in order to grasp the skills needed in the transfer process when working with foreign expatriates, e.g., Shanghai VW has employed 107 long-term (approximately 3-year stay) German specialists in all, and on average about 200 short-term (less than six months) foreign specialists every year since its establishment, passing on knowledge and enabling organisational learning.

This practice of "grafting individuals" in the recipient was considered to be very effective in improving the capacity of absorption and facilitating knowledge transfer.

It is clear from this investigation that a dedicated team in place is the prerequisite for a successful knowledge transfer and organisational learning within multinational corporations. This has confirmed the argument made by Hedlund and Riddersaträle (1994) that teams need to be created to ensure that learning is embedded in the knowledge recipient firm in the transitional markets.

There has been a common approach in copying among the four firms in this research. This begins with sending in expatriates and technical teams to carry out the initial establishment of the production process and to supervise trained local employees to follow the headquarters' operation practices. This was supported at the same time by the teams in the headquarters, such as the China project coordinators in Alcatel Bell, to deal with issues beyond the capability or control of the site teams. Although training had been offered to all newly recruited employees, copying within the four firms was still primarily a process of "learning by doing"(Nonaka and Takeuchi, 1995; Lall, 1980), as numerous new bits and pieces needed to be grasped to achieve the desired performance. Mr Liu, the training officer of Motorola (China), commented:

> Learning does not stop after training. Instead, learning started from training for every employee in Motorola. Everyone should keep learning the skills needed to perfect his/her job, irrespective of workshop employee or managerial staff. This is the reason why we have maintained a significant training schedule since our establishment in 1992 (every employee of this firm, including the general manager, has to attend at least one-week training each year). This has created opportunities for encouraging employees to learn not only from foreign expatriates and engineers, but also from colleagues of the same unit.

Mr Zheng Yulu of Shanghai Bell made a similar comment based on his personal experiences:

> I was a graduate in the 1960s. Although having worked on the R&D aspect of telecommunications equipment continuously, I felt myself to be struggling when I joined this firm in the middle of the 1980s. I had no choice but to keep learning, learning from foreign instructors during the training sessions, learning from the technicians sent from Alcatel Bell's headquarters, and learning from my colleagues who knew western technologies better than me, etc. As a matter of fact, I used most of my spare time then in these learning activities.....To be honest, I was not exceptional. Every one had to learn otherwise he or she could not cope with the job.

The distinctive difference in terms of copying between the wholly-owned subsidiary and the joint ventures here is that Motorola (China) started with the production of three products in 1992: semiconductor, pager and cellular phone, while the three joint ventures each started only with the assembling of one product, i.e., S12 in Shanghai Bell, Santana passenger car in Shanghai VW and Cherokee in Beijing Jeep. Hence, the volume of copying is a lot greater in the subsidiary than in the joint ventures. The other significant difference in copying is that joint ventures began with the easiest parts of the production process: assembling and testing. Complete components were imported from the foreign parents to these joint ventures for assembling. Then, copying was extended to have some simple components manufactured locally, which was followed gradually by more components with higher sophistication being produced in the Chinese market. The reason for this reverse-engineering to take place is two fold: one is the lack of absorptive capability on the recipient side, which will be dealt with in detail below; the other is the non-existence of quality component suppliers, which became increasingly problematic

when localisation became the priority of these joint ventures. The lack of financial resources also created some constraints on the copying process from time to time in the recipients.

This 'from-easy-to-difficult' approach, however, was not found in Motorola (China), where, from the very beginning, the final products listed above (as well as some components) were produced simultaneously based on its huge investment. Moreover, some research centres (the software centre, mobile telecommunications products centre, manufacturing technology research centre and paging research and development centre) were established at roughly the same time as the production lines, in order to facilitate the further development and adaptation of the current product range. This reflects Motorola's global division of production, with its Chinese subsidiary being assigned to develop and manufacture lines of products not only for the Chinese market but also world markets. This difference also speaks in support of the previous discussion on Motorola's entry motivation in the Chinese market (see Section "6.21 The strategic motives of MNCs in entering the Chinese market" for detail).

Adaptation

The last step in the application stage of knowledge transfer and organisational learning is adaptation. Due to social and other natural differences between countries, every product needs to be modified somewhat before being wholly or adequately compatible with the targeted markets. Adaptation therefore becomes a crucial stage

in the knowledge utilisation and organisational learning process. From Section "2.52 The process of organisational learning", it is clear that, during the process of organisational learning, adaptation, customisation and modification are normal phenomena employed to make the articulated knowledge realise its most potential. Reuber and his colleagues (Reuber *et al.*, 1973) further argue that technology adaptation by affiliates in developing countries is more common in market-seeking than in resources-seeking or rationalised FDI.

According to the interview data, all the technologies introduced into China in these firms experienced certain adaptations before the products in question were put into full-scale production. Adaptation covers both hardware and software relating to the products, production engineering, production management systems and quality control system. In the case of Shanghai Bell, the main problem of the S1240 in the Chinese market at the very beginning, was that software aspect of this product was not mature enough to suit the Chinese market.

> There were many problems that occurred in the process of producing and installing the products. The original prototype technology was just developed and the actual product would be installed in Norway in June 1986. No other systems had been installed elsewhere in the world. The telephone system in China then was very complicated, with various systems installed at different times being integrated into the national grid. Some of the systems were actually installed 50 or 60 years ago. So the whole communication system was terribly complex. The Belgian side was not prepared to encounter such a difficult system in China. Their software was not capable of meeting the needs of the Chinese system. As a result, in the first phase some of our customers in Shanghai and Beijing met lots of problems when using our System 12. Many customers would not like risking to accept such an unstable product. So our marketing position was very weak. We had to carry out lots of modifications, or even develop some new functions, to meet the requirements of the specific customers or revising the defects of the original system that magnified themselves only in the new environment.
>
> (Ms Yin Linggu, Shanghai Bell)

In the opinion of the interviewees, as long as software problems were solved, then the adaptation of hardware did not pose a great challenge. The Belgian partner realised its promise by helping Chinese engineers to adapt the System 12 to meet both the Chinese criteria and the practical needs of the Chinese market. Every element of this product series went through a process called CDE (country development engineering, or customer development engineering) carried out by a specific CDE department. As a result, in December 1986, the first System 12 was transferred to the Bureau of Post & Telecommunications of Hefei, the capital of Anhui Province. It indicated that the System 12 technology was viable when applied in China. In the year after, i.e., 1987, both sides made great efforts to solve the remaining minor problems. During this process, the Chinese engineers fully 'digested' the System 12, and established trust with the expatriates within Shanghai Bell and with the technical support teams in the headquarters of Alcatel Bell. This is exactly the 'learning by adapting' referred to by Lall (1980). Therefore, problems occurring in the adaptation process are quite normal. What needed is a specific team, CDE department, working on a specific process – CDE – to fill in the gaps between a technically advanced product and a potential foreign market. This enables the product concerned to become workable and competitive in a new environment.

Adaptation has also been found to be a crucial stage in the other three firms. The Santana of Shanghai VW and Cherokee of Beijing Jeep have both experienced substantial modifications, e.g., to the braking system, car horn and engine. This is due to poor road conditions in most cities and the countryside of China. The majority of roads are of low grade, which contributes to the higher wear and tear on cars. To

make it worse, there is a lack of traffic management systems (traffic lights, traffic signs and traffic monitoring systems), coupled with frequent violations of the highway code by both drivers and pedestrians, which argued for the introduction of more sophisticated and reliable cars. It demonstrates the impact of China's "underdeveloped social infrastructure", as discussed in Chapter 3, on the automotive industry.

The need to modify telecommunications products made by Motorola is more obvious, as there are always certain technical and infrastructural differences from country to country, e.g., 110 volts electricity in North America but 220 volts in China. More importantly, there was a great need for having Chinese language text services on pagers and mobile phones. If Motorola wanted to maintain its market leadership, it would be an imperative to adapt its products in this respect. Motorola carried out the so much-needed adaptations, and its continuing dominance in the Chinese market, as discussed in Section "4.3 Profile of Motorola (China) Electronic Limited", is a reflection of the success of the adaptations it made.

Increasingly, MNCs perceive their ability of modifying their products to meet country-specific customer needs as a competitive advantage in its own right (Dunning, 1993: 295), especially when the host market is relatively large, as in the case of the Chinese market. For example, Ms Yin Linggu of Shanghai Bell pointed out one of the reasons responsible for the success of this joint venture was its strong CDE capability:

> We have an outstanding team working in CDE. What they have achieved is bridging up the advanced S12 with the complicated telecommunications network of Chinese customers. Is it easy to do? No, not a bit. I emphasise this

> is not an easy ride simply because the engineers have to deal with both software and hardware issues, and both foreign technologies and the Chinese network. There have been quite a few joint ventures established in this business [telecommunications exchanges] between German, Japanese manufacturers, such as Siemens, NEC, and Chinese telecommunications manufacturers, and they never posed serious threats to us. Why? One of our strengths [comparative advantage] is our strong CDE capability. To a certain extent, our success (in CDE) paved the way for the fact that our output levels took off and for our dominant market share.

Mr Cheng Gang of Shanghai VW also considered their capability of adaptation and modification as an important part of firm specific advantages:

> We have always regarded adaptation and modification as the only way of making the foreign product acceptable in the Chinese market. Indeed, we never ignored R&D. However, our R&D started with adapting the transferred product (Santana) according to the road conditions and customer needs. We are successful today because we put investment into this aspect from the very beginning and I am pleased to see our efforts paid off.

So, adaptation is not only a matter of understanding and interpretation of the transferred knowledge. It also demonstrates the capability of refining the transferred knowledge based on an appreciation of the customer needs in the Chinese market. The above evidence is in line with the argument of Section "2.52 The process of organisational learning" that, during the process of organisational learning, adaptation, customisation and modification are normal phenomena for making the articulated knowledge realise its most potential. It also supports the suggestion made by Reuber *et al* (1973) that technology adaptation by affiliates in developing countries is more common in market-seeking FDI.

The ability to conduct adaptations can only be achieved by combining two fronts of organisational learning, i.e., the learning of the transferred knowledge from the

foreign parent and the learning of local knowledge residing in the Chinese partner(s) in the case of joint ventures, or in the local employees in Motorola (China). The inclusion of learning local knowledge into the organisational learning process makes a qualitative difference to knowledge transfer because it effectively turns adaptation into a process of knowledge transformation and even knowledge creation (Hedlund and Nonaka, 1993). Learning is therefore shifted from an emphasis on simply understanding and copying the transferred knowledge to a new phase of integrating the transferred knowledge with the local knowledge, and to developing new knowledge in response to the competitive situation of the host market. This was exemplified in the modification and refining of the transferred products according to the needs of the Chinese market. Chinese employees were therefore not pure learners any more, they contributed to the newly developed competencies [of the affiliate] as an outcome of organisational learning and the response of the affiliate to local market demand. Foreign expatriates, on the other hand, had to facilitate the learning of local knowledge by promoting local employees, enabling them to have a bigger say in managing the business operations of the affiliates. The success of Shanghai Bell, for example, demonstrated the importance of listening to the local employees when operating in the Chinese market.

> The Chinese directors have always maintained that we should respect the expertise of Belgian side very much. At the same time, the Belgian side, though bearing some of common characteristics of western firms, is very flexible in dealing with us. They are listening to us. Lots of westerners don't listen to Chinese. They think they know every thing in this market. But the Belgians have been listening to us, they are very flexible, and can compromise if we are reasonable [in interpreting the customer needs and putting forward proposals for modifications]. So, broadly, [for foreign investors], if you want to succeed, you must have patience, you must be flexible, you must listen to Chinese when coming to this market. You cannot say I am No. 1 here.
>
> (Ms Yin Linggu, Shanghai Bell)

Data collected from the other three firms of this investigation also support this argument too. Motorola, with the belief that only Chinese employees know China well enough to make the correct marketing and product decisions for Motorola (China), and that expatriates are too expensive for long-term competitiveness, has utilised local knowledge significantly in its business operations, through its commitment to localising staffing in China as quickly as possible. To this end, it established the fast track management localisation programme "CAMP" (Chinese Accelerated Management Programme). It also held in-house training programmes with inputs from local officials and from tutors drawn from prominent Chinese universities. Moreover, Motorola (China) established several R&D centres immediately after the installation of the manufacturing facilities for the sake of seeking local knowledge, as local researchers conducted modifications on the current range of products as well as carried out some cutting-edge researches for the global market in these centres. These are just part of the picture in which local knowledge has been emphasised in making the products of Motorola (China) competitive in the Chinese market. The efforts of this company to identify and nurture capable Chinese citizens and provide them with the most extensive foreign-operated training programmes in China have already begun to pay off. Today, Chinese managers have taken up most of the middle level management positions in the company. Training continues to enlarge this proportion and increase the number of local higher-level managers. This is being done against a background of continued rapid growth in Motorola's operations in China.

To the same extent to the firms in the telecommunications equipment industry, Shanghai VW and Beijing Jeep of the automobile industry also relied heavily on the local knowledge of their Chinese partners in their adaptation processes. They both benefited from the fact that their Chinese partners had been established passenger car producers for a long time, boasting extensive knowledge on, and links with, local government, component suppliers, financial institutions and marketing channels. These two firms were quickly alerted with information on problems arising from the existing models, and communications were conducted on how to refine these foreign cars to suit the taste of the Chinese customers. They also sorted out the complex relationship with local governments and banks, seeking support in adapting the transferred models with locally available financial resources.

The very fact that Motorola (China) has managed to utilise local knowledge without a Chinese partner indicates that joint venture partnership is not a prerequisite for tapping local knowledge. However, local knowledge has been tapped differently between Motorola (China) and the three joint ventures. In other words, local knowledge resides in different bodies within these firms. Motorola (China) obtained local knowledge from its employees through integrated recruitment policy, i.e., it tapped local knowledge residing in individual employees, irrespective their capability in R&D, or their knowledge on, and connections with, local business environment (marketing channels, access to the bankers of local financial institutions, access to key officials in local government bureaus, knowledge about local and national component manufacturers, etc.). Joint ventures also obtained local knowledge residing in individual employees. But, more important, they

inherited those local knowledge that had embedded in its Chinese partners, i.e., those knowledge that resided in institutions instead of individuals. Local knowledge held by the Chinese partners at institutional level is very important in doing business in this market, because, as we are going to see in Section "7.3 The key factors in the knowledge transfer and organisational learning process", it can pave the way to government support which is crucial for achieving success in the Chinese business environment. Although it seems that the joint venture form can provide more up-front local knowledge [from both newly recruited local employees and the Chinese partner] than the wholly-owned subsidiary does [which solely relies on newly recruited employees], the impact of this advantage on business operation cannot be overestimated. That Motorola (China) outperformed the three joint ventures in this investigation in the Chinese market, as shown in Section "7.5 The improvement of firms' competitiveness as a result of knowledge transfer and organisational learning", suggests that wholly-owned subsidiary can find ways to leverage against the advantages joint ventures enjoy in terms of providing more local knowledge residing in their Chinese partners in the process of business operation. Further research is needed to explore the ways in which wholly-owned subsidiary achieves this in the Chinese market.

As a result of integrating the transferred knowledge and the local knowledge during adaptation processes, organisational learning within the four firms became the main vehicle of creating firm competitiveness in the Chinese market. This indicates the central role played by organisational learning in the "evolutionary process" (Chang and Rosenzweig, 1995: 4) of MNCs' entry into the Chinese market.

7.24 Dissemination: Further knowledge transfer and organisational learning

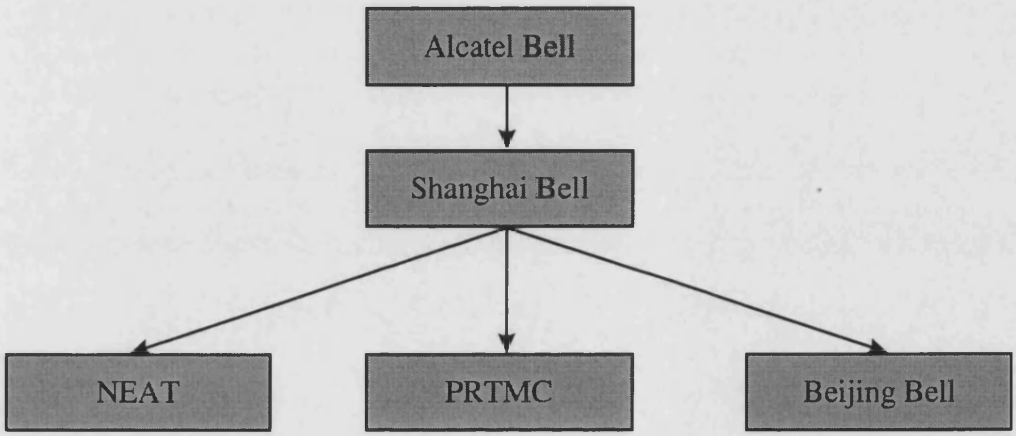
7.241 Further knowledge transfer from the four firms to their own affiliates

As discussed in Section "2.52 The process of organisational learning", dissemination is the route for the recipients to further exploit the utilised knowledge in a wider environment. The current literature suggests that it is legitimate to assume that at this stage the output knowledge is further transferred from the recipient to its own affiliates or firms related through business process (suppliers or potential cooperative partners).

The data collected from this research reveal that the two firms in the telecommunications industry have pursued this secondary transfer vigorously: Shanghai Bell has transferred technologies, management skills and social knowledge to its own affiliate Northeast Asia Telecommunications Manufacturing Co. (NEAT) of Liaoning Province, Pearl River Telecommunications Equipment Manufacturing Co. (PRTMC) of Guangdong Province [i.e., Canton] and Beijing Bell; while Motorola (China) has done the same to its wholly-owned subsidiaries in Suzhou of Jiangsu Province and Leshan of Sichuan Province. A repetition of the knowledge transfer and organisational learning process has been carried out in these sites, similar to that between Alcatel Bell and Shanghai Bell, and between Motorola and the Tianjin site of Motorola (China). Royalties and other payment in relation to the knowledge transferred and training programmes held have been included in the joint

venture contracts. The aim has been to make Shanghai Bell and Motorola (China) stronger in terms of the degree to which its firm-specific advantages are established in the Chinese market. The following figure shows the secondary knowledge transfer conducted in Shanghai Bell.

Figure 7-1: Secondary knowledge transfer within MNCs: The case of Shanghai Bell



What differs from the initial knowledge transfer into China is that the scale of secondary knowledge transfer is smaller, usually covering only part of the business lines of Shanghai Bell and Motorola (China), and the "expatriates" this time are usually Chinese instead of foreigners. In most cases only Chinese is used as the sole working language, thus increasing the speed of knowledge transfer and organisational learning in the recipient firms. Through these joint ventures, both Shanghai Bell and Motorola (China) have not only increased their production volume, rationalised their internal production division, and therefore achieved greater efficiency by way of internal trade, but also become key players in several of the most important local markets which are heavily regulated by the provincial

governments. The strategy of setting up joint ventures and carrying out secondary knowledge transfer has contributed greatly to the success of the two firms in the telecommunications manufacturing industry of China in the 1990s. This finding of secondary knowledge transfer is in line with the organisational learning theory, which argues that the "commitment to past success programmes" pushes firms to search for similar situations and environments for the setting up of collaboration and structures in a similar way (Lyles and Salk, 1996), in order to achieve maximum benefit, by repeating the learning process in different settings.

Comparatively, the two firms in the automotive industry, Shanghai VW and Beijing Jeep have done very little in this regard. Certainly Shanghai VW and Beijing Jeep have further transferred some knowledge to other firms, such as first tier suppliers, by way of localisation, quality control, product innovation and upgrading. Shanghai VW disseminated to its first tier suppliers the technical specifications and quality requirements of the expected components. It also provided training sessions for managers and engineers from its main components suppliers on technological, manufacturing and management issues. More importantly, Shanghai VW viewed the main suppliers as part of its campaign to improve its environmental management. All the components must reach the expected environmental standards before signing supply contracts. Hence, certain knowledge has been transferred to Shanghai VW's first tier suppliers as a result of its stringent quality standards and active technical and management assistance. In the case of Beijing Jeep, apart from its first tier suppliers, as in the case of Shanghai VW, technology and management skills have also been further transferred to revitalise the old product series of Beijing

Automotive Works, i.e., the BJ212 series, which is now part of the production range of Beijing Jeep. This is part of the strategy of the Chinese partner in engaging in this joint venture. The aim has been to upgrade the old BJ212 series, enabling it to be a cash cow so that Beijing Jeep can subsidise the assimilation and production of the new Cherokee XJ series. According to the joint venture contract, the technology transferred from AMC to Beijing Jeep is allowed to be used in upgrading the old BJ212 series (Bunns, 1996), i.e., no additional payment has been needed for the intellectual property held by AMC in this case. BJ212L was the first product based on this further transfer and utilisation of the technology and management skills transferred from AMC (and Chrysler), ending an era of no serious innovations made in the BJ212 series for twenty years. It included 26 innovations and upgrading of 385 components, concerning areas of braking system, noise reduction, emission reduction, and so on. In 1989, BJ212N, the other refined model, was presented to the Chinese market, which had 28 innovations compared with BJ212L.

Based on the above evidence, this research confirms that the knowledge firstly received and utilised by the four firms concerned has been further transferred to their own affiliates in the Chinese market, which is consistent with the relating argument contained in Section "2.52 The process of organisational learning". The taking place of secondary knowledge transfer is an indication of the successful utilisation of the transferred knowledge and organisation learning by the four firms. The further transfer of these gained output knowledge to their affiliates owned by the four firms concerned is a way of consolidating firms' competitiveness in this transitional market.

The difference between the two approaches to knowledge transfer applied by Shanghai Bell and Motorola (China) of the telecommunications manufacturing industry on the one hand, and Shanghai VW and Beijing Jeep of the automobile industry on the other, is that the former is an integrated strategy based on affiliate growth, while the latter solely targeted quality control and cost competitiveness. Why were different approaches used in these two industries in China? One plausible explanation seems to be the difference in fixed costs for setting up a manufacturing plant, and the resulting differences in minimum efficient scale between these two industries (Hill, 1999: 466). A car assembly line needs huge amount of investment to start up, and the production volume for reaching economies of scale is about 300, 000 units annually. It is therefore more efficient and economical to concentrate car assembly lines in fewer locations, to raise the utilisation of capital equipment and generate the productivity gains from increased production volume. The fact that currently China is only a medium sized automobile market in world, compounded by market segmentation arising from local government protection within China, simply does not allow Shanghai VW and Beijing Jeep to set up new assembly lines elsewhere in China. An increasing reliance on car component suppliers by these two firms, instead of in-house sourcing, is a sensible strategy to gain economies of scale. Therefore, knowledge transfer and utilisation can mainly take place in the manufacturing sites of Shanghai VW and Beijing Jeep, and secondary knowledge transfer is limited to their first tier suppliers, and to their Chinese parents at most.

In contrast, the fixed cost of setting up a manufacturing plant in the telecommunications industry is comparatively low, and the production volume for reaching economies of scale is modest. Moreover, the high value-to-weight ratio of telecommunications products indicates that transport costs do not occupy a big share in final product price. Hence, benefiting from the rapidly increasing demand in the Chinese telecommunications market, several assembly plants can be established by Motorola (China) and Shanghai Bell respectively without compromising their economies of scale. Between them Motorola (China) established two more manufacturing sites in Suzhou and Leshan after its first Tianjin production base; Shanghai Bell also set up two more large-scale assembly plants in Beijing and Guangzhou, and a few smaller sized manufacturing sites, such as NEAT. To build up their competitiveness, both Motorola (China) and Shanghai Bell have transferred a great volume of knowledge to their affiliates by employing the same transfer mechanism that enabled themselves to learn from their foreign parents in the first place. A repetition of the same transfer mechanism within these two firms clearly indicates the effectiveness of organisational learning (Lindholm, 1998). This has been consistent with the finding made by Tiemessen *et al* (1996), who claim that learning can be achieved through harvesting which involves retrieving practices that have been created in other units or organisations and then implementing this knowledge in the MNC or IJVs.

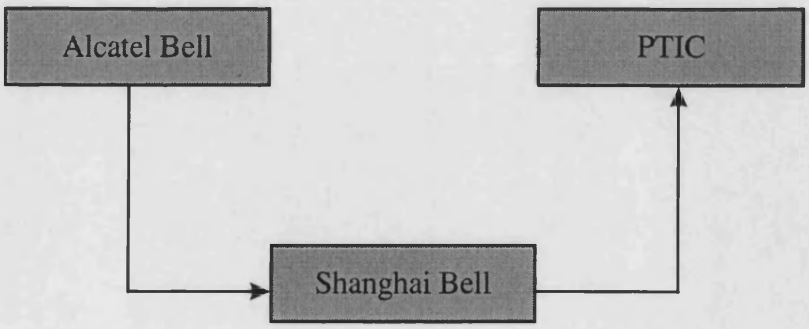
7.242 Further knowledge transfer from the three joint ventures to their Chinese parents

Knowledge transfer can be extended to benefit the parents of joint ventures. In Section "2.53 Knowledge transfer from the affiliate to the parent", we suggest that the output knowledge (Westney, 1988) of an IJV can be used by the parents to enhance its own strategy and operation. We have found in this research that the transferred knowledge from foreign parents has been further transferred to not only affiliates of Motorola (China) and Shanghai Bell, or the first tier suppliers of Shanghai VW and Beijing Jeep, but also to the Chinese parents of the three joint ventures. This type of further knowledge transfer is mainly concerned with management skills, quality control and some social knowledge instead of technology, as specific technology is patented and remains the property of foreign parents. There is no report of technologies being leaked to Chinese parents. However, the managers of the Belgian parent Alcatel Bell revealed during the interviews that they suspected that some of their technologies might have been secretly transferred from Shanghai Bell to other Chinese indigenous manufacturers. However, we recognise that this is extremely difficult to prove without launching an extensive investigation. Actually, the interview data reveal, what the Chinese parents need in earnest, in addition to transferring advanced technologies, is the opportunity of learning western style management, and of transforming the outdated management systems inherited from the central planning economy still prevalent in their other subsidiaries. This further signifies the importance of differentiating management skills from technology.

> One of the aims of establishing joint ventures with famous MNCs is to learn their management skills. In a sense, management knowledge is more difficult to obtain than pure technologies. Sometimes you can buy advanced technologies from foreign countries. However, they will not work if no compatible management systems are set up. Numerous tragic examples of this kind took place in China in the 1970s and 1980s. Establishing joint ventures with famous MNCs provides windows of learning western style management. This is the most effective way of learning if compared with other modes, such as sending limited staff overseas for three months or half a year, or inviting several foreign experts to your factory … Our headquarters take this very seriously.
>
> (Cheng Gang, Shanghai VW)

The data collected reveal that some management knowledge has been transferred from the three joint ventures to their Chinese parents by way of training, site visits, and personnel exchange, i.e., from Alcatel Bell to the Post and Telecommunications Industry Corporation of China (PTIC) through Shanghai Bell, from VW to Shanghai Automotive Industry Corporation (SAIC) through Shanghai VW, and from Chrysler Motor Corporation to Beijing Automotive Works (BAW) through Beijing Jeep. This can be illustrated as follows by using the case of Shanghai Bell:

Figure 7-2: Knowledge transfer from foreign parents to Chinese parents via joint venture: The case of Shanghai Bell



Similar picture can be found between Beijing Jeep and Shanghai VW, and their Chinese parents. For example, BAW used Beijing Jeep as a base of training high

rank managers. Shanghai VW received frequent visitors from its Chinese parent, and its management practices have been made available to managers in the state-owned firms belonging to SAIC.

> BAW sent managers for training in Beijing Jeep in the 1980s. It also promoted some managers from Beijing Jeep to its top management team. In practice, Beijing Jeep became one of BAW's bases for management training.
>
> (Ms Sun Ying, Beijing Jeep)

> We have received visitors from SAIC Group on a frequent basis. SAIC is our Chinese parent and we are more than happy to accommodate requests from managers of SAIC Group to visit SVW. Our managers sometime also went to training sessions held in SAIC introducing SVW's practices of business operation.
>
> (Mr Cheng Gang, Shanghai VW)

But only very limited western expertise and management practices in areas such as marketing, including after sale service, human resources management, quality management and supplier management, have been applied in these Chinese parents, or, through them, to their non-joint venture subsidiaries. This can be attributed to two reasons:

One is the lack of progress in reforming the macroeconomic management system of China. The government still possesses extensive rights to interfere in the business operations of state-owned firms. Any bold reform of the current management system in these state-owned firms would need the approval of governments at the various levels, which is difficult to achieve. Two is the lack of motivation among the management teams in these three Chinese parents that were formerly industrial bureaus of local governments (in the case of the parents of two automotive joint ventures) or the central government ministry (in the case of Shanghai Bell's Chinese

parent). Those bureaucrats-turned-managers are more concerned with opportunities for personal promotion to the powerful ministries than with the upgrading of the current management systems and the renewing of corporate cultures. As one manager of Beijing Jeep remarked:

> Workers are not happy with the way the Chinese top management team is created and assessed. They are not appointed by Beijing Automotive Works (the Chinese parent) but by Chinese Automotive Industrial Corporation (the parent of Beijing Automotive Works). They are not responsible for any failures of business operations. When in trouble, they will, like their predecessors, be moved to other government posts or joint ventures, and a new team of managers will be appointed.
>
> (Ms Sun Ying, Beijing Jeep)

So, it remains an objective for China to renew old management practices and corporate culture that are still dominant in firms that are not affiliated to multinationals. Setting up joint ventures has provided windows for organisational learning. This confirms our argument in Chapter 2 that knowledge from a JV, called output knowledge by Westney (1988), can be used by the parent company to enhance its own strategy and operations. It is also consistent with our finding in Chapter 6 that the leading criteria in selecting foreign partners by local Chinese firms are the strategic assets held by the foreign firm, such as technological advantages, financial resources, and management skills (although the importance of these is often only fully realised later), because for the local firms, learning is a motive for the formation of IJVs (Inkpen, 1995a). In general, it is clear that the Chinese parents of these joint ventures benefited from the transferred knowledge, in particular management skills, residing in their joint venture affiliates.

There is no evidence suggesting any significant difference between the three joint ventures, or even between the two industries in respect of secondary knowledge transfer to the Chinese parents (except that secondary knowledge transfer to a Chinese parent in Motorola (China) is not possible). Indeed, all the foreign parents, irrespective of American or European, kept a hands off approach in treating the further transfer of management knowledge from these joint ventures to their Chinese parents, while closely monitoring the transferred technologies. This can be attributed to the fact that management knowledge is unlikely to be branded as a firm's private assets, and the dissemination of it can only facilitate the reform of Chinese state-owned firms and the establishment of good relationship between foreign and Chinese parents, which is crucial for doing business in China (Child and Lu, 1996; Davies, 1995), as discussed in Chapter 3.

7.243 Further knowledge transfer from the three joint ventures to their foreign parents

Knowledge transfer is not a one-way street. In Section "2.53 Knowledge transfer from the affiliate to the parent", we can see that an affiliate will eventually develop to such a point where it has newly developed knowledge and capabilities to transfer to the home country parent (Chang and Rosenzweig, 1995:23). We further argue in Section "2.54 Extending the analysis" that, in the case of market entry via JV into the liberalising markets of the CEECs and China, it is quite possible for there to be elements of 'reverse-learning' by the parents (or at least one of the parents) from the

affiliate. Furthermore, the JV-derived knowledge might be used in the design and management of other JVs and alliances (Lyles, 1988).

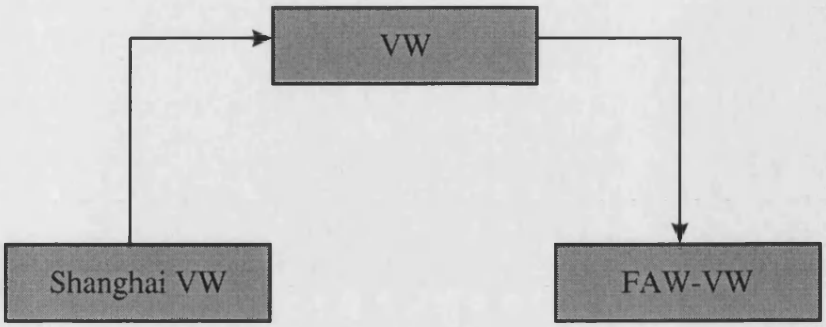
In fact, some new knowledge has been sent back to the foreign parents by these four firms, here referred to as "reverse-learning". This new knowledge mainly includes management skills and social knowledge, which is a result of the localisation of western management skills and social knowledge in the Chinese market. Technological advances made by these subsidiaries are also part of the package, however, although some advances were delivered on the current range of products by the three joint ventures, e.g., Shanghai VW's Santana 2000, they are not regarded good enough to be worthy of transfer. Only the three joint ventures qualify the categorisation of reverse knowledge transfer discussed in this section. Motorola (China), as a wholly-owned subsidiary of Motorola, was designed to be one unit of Motorola's globally linked innovation system (Hill, 1999), and its new product development serves the needs of the whole company, hence the flow of technology-related resources from it to other units of Motorola cannot be categorised as simple reverse knowledge transfer. Moreover, there is no evidence to suggest that any of the newly acquired local knowledge has been transferred overseas. Unlike the joint ventures, all the expansions made in the Chinese market have been under the leadership of Motorola (China), instead of its parent. For this reason, our discussion on reverse knowledge transfer is confined to management skills and social knowledge developed by the three joint ventures.

Doing business in the Chinese market is a huge challenge for any FDI. The rich experiences accumulated by the established affiliates provided an opportunity of learning for those foreign parents who aspired to establish more affiliates there. Having digested this new knowledge deriving from the Chinese market, the foreign parents can then re-use them in opening up new Chinese joint ventures. Among the three joint ventures, Shanghai VW and Shanghai Bell transferred a great deal of knowledge (management skills and social knowledge) to the new joint ventures established by their respective foreign parents, VW and Alcatel Bell. After experiencing the success of Shanghai VW, VW set up a new joint venture in 1992, FAW-VW, with First Automotive Works (FAW), the biggest automotive manufacturer in China. According to Mr Sun of Shanghai VW, FAW-VW entirely applied the management system and practices of functional area (marketing, finance, human resources management, supplier management and so on) of Shanghai VW.

> FAW-VW was established in the beginning of the 1990s, after Shanghai VW had been successful. It replicated our organisational structure and applied our management practices in major functional areas. This saved them quite a lot of time.
>
> (Mr Sun, Shanghai VW)

Based on this tried and tested knowledge, FAW-VW has quickly emerged as a competitive producer, and further expansion of production is currently under way to match that of Shanghai VW. This fresh evidence strongly demonstrates the importance of knowledge transfer and utilisation in general, and reverse learning in particular.

Figure 7-3: Reverse-learning by foreign parents: The case of VW



The other example in support of the above argument is the reverse-learning by Alcatel Bell in the case of Shanghai Bell. Similarly, Alcatel Bell has re-employed the expertise it drew from Shanghai Bell in another six new joint ventures in the Chinese market. Contrasting with VW's approach, Alcatel Bell has chosen a different line of business for these new firms so that their growth will not pose any threat to the well-being of Shanghai Bell. As one manager of Alcatel Bell explained:

> We have another six joint ventures in the Chinese market, but not in the same product markets (switching systems) as Shanghai Bell. These joint ventures are usually producing some "smaller" products, such as connectors, mobile phones, etc.
>
> (Mr Jacobs, Alcatel Bell)

These two cases are consistent with the point made by Chang and Rosenzweig (1995:23) that the affiliate will eventually develop to such a point where it has newly developed knowledge and capabilities to transfer to the home country parent. They also fully support the proposition put forward by Lyles (1988) that the knowledge obtained through reverse-learning by the foreign parents from their affiliates, can be re-used in the design and management of later market entry by other affiliates of the same parents in the same transitional market, and plays a very important role in

improving the firm competitiveness of the later entrants. The acquisition of the output knowledge (Westney, 1988) produced by an affiliate in a specific market can be valuable for the subsequent success of the parent firm in its market-seeking foreign direct investment. This finding is consistent with the discussion by Bartlett and Ghoshal (1995) on the transfer of learning across organisational subunits, but not fully support the idea that affiliates as generators of scientific knowledge made by Papanastassiou and Pearce (1997, 1998), as no evidence has been found among the three IJVs of this investigation that significant development was made at the technological front on the current range of products. However, it is possible that, at least one or two of these three IJVs, will be capable of becoming the generator of scientific knowledge within respective MNCs when the current trend of growth can be maintained in a longer time. Indeed, the continuous rise in sophistication in the Chinese market has created a climate where innovation will become the key to firm competitiveness. The two cases are a further indication of the direct linkage between the strengthening of firm competitiveness and knowledge transfer and utilisation, which is also consistent with our findings in preceding sections.

Comparisons can be made among the three joint ventures of this investigation in respect of further knowledge transfer to foreign parents. The collected data indicate that the joint ventures all carried out reverse knowledge transfer but in different styles: VW applied its acquired knowledge (management skills and social knowledge) and the tested management systems from Shanghai VW to its only one new joint ventures, FAW-VW. However, Alcatel Bell applied its acquired knowledge in another six joint ventures it established after Shanghai Bell, obviously

on a larger scale. Chrysler, the foreign parent of Beijing Jeep, did receive some reversely transferred knowledge (local knowledge, adapted management skills and so on). However, it did not re-use it in the Chinese market because it did not establish any more joint ventures. This different pace of applying the reversely transferred knowledge in the Chinese market relates to the respective firm's competitive strategy. More fundamentally, it was a result of the discriminatory government policy towards the two industries in question: the Chinese government allowed easy access for FDI in its telecommunications manufacturing industry, but it froze any applications to set up new assembly lines in the automotive industry until 1997. This is a telling piece of evidence demonstrating the impact of government regulation on FDI in China's "socialist market economy".

7.244 A refined stages model of MNC evolution in transitional markets

As a result of knowledge transfer and utilisation, these four firms have become not only big producers, but also market leaders in servicing their customers in China and even other neighbouring countries. Interview data demonstrate that they did follow a process model of MNC evolution, as proposed by Chang and Rosenzweig (1995), to build up their capabilities in two respects: LOB (line of business)-specific capability development and country-specific capability development.

Within the international management literature it was Kogut (1983) who first discussed foreign direct investment as a sequential process. Later, Kogut and Zander (1993: 640) noted that "The sequential expansion of a firm's activities after first

entry is an expression of the evolutionary acquisition and recombination of knowledge." Their study seeks to describe the organisational learning process within an international business context, in which MNCs as a whole acquire knowledge and develop capabilities facilitating further foreign market entry via FDI. This approach is similar to Bartlett and Ghoshal (1995), who maintained that a process perspective, emphasising organisational learning, held special promise for our understanding of the MNC. They noted that a key feature of these organisations was their ability to learn from multiple products and geographic markets, and to transfer that learning across organisational subunits (Chang and Rosenzweig, 1995).

As this research has shown, the four firms under study have invested substantially in facilitating knowledge transfer and organisational learning, in order to assimilate the knowledge obtained from their foreign parents and from the Chinese market. What is more, we have seen the secondary knowledge transfer carried out by these four firms and its importance in establishing firm competitiveness in host markets. As we discussed in Section "2.53 Knowledge transfer from the affiliate to the parent", this reverse knowledge transfer and utilisation is a hallmark of the maturing of organisational learning. The changeover of these four firms from pure knowledge recipients to partial knowledge exporters can actually be viewed as one indication of the firms' success in their first stage of development in the Chinese market. In terms of secondary knowledge transfer, i.e., firms previously receiving knowledge from their foreign parents transferring their utilised knowledge to their own affiliates, Shanghai Bell and Motorola (China) have done particularly well. Apart from setting up sales representatives or sales offices, a key strategy of Shanghai Bell and

Motorola (China) has been to expand their market by way of building up joint ventures with local governments, provincial bureaus of post and telecommunications, and manufacturers.

Up to now, Shanghai Bell's progress is very encouraging: at least six affiliates have been in operation in Liaoning, Guangdong and Beijing, and several more are in discussion. Motorola (China), on the other hand, can be described as very successful in this regard: as listed in Chapter 4, eight joint ventures (including six joint research centres) have been established. The format for setting up these new joint ventures is that Shanghai Bell and Motorola (China) contribute their technological expertise, responsible for the whole management process, while the local partners invest capital, provide manufacturing site and marketing channels for the new firm. What Shanghai Bell and Motorola (China) have done here is extending their own capabilities in technology, production and management into these new establishments by way of repeating the knowledge transfer process they experienced before, controlling local markets, gaining a considerably more profit, by reducing costs. This secondary knowledge transfer from Shanghai Bell and Motorola (China) to their own affiliates as a result of successful knowledge utilisation is a significant finding in our study of knowledge transfer.

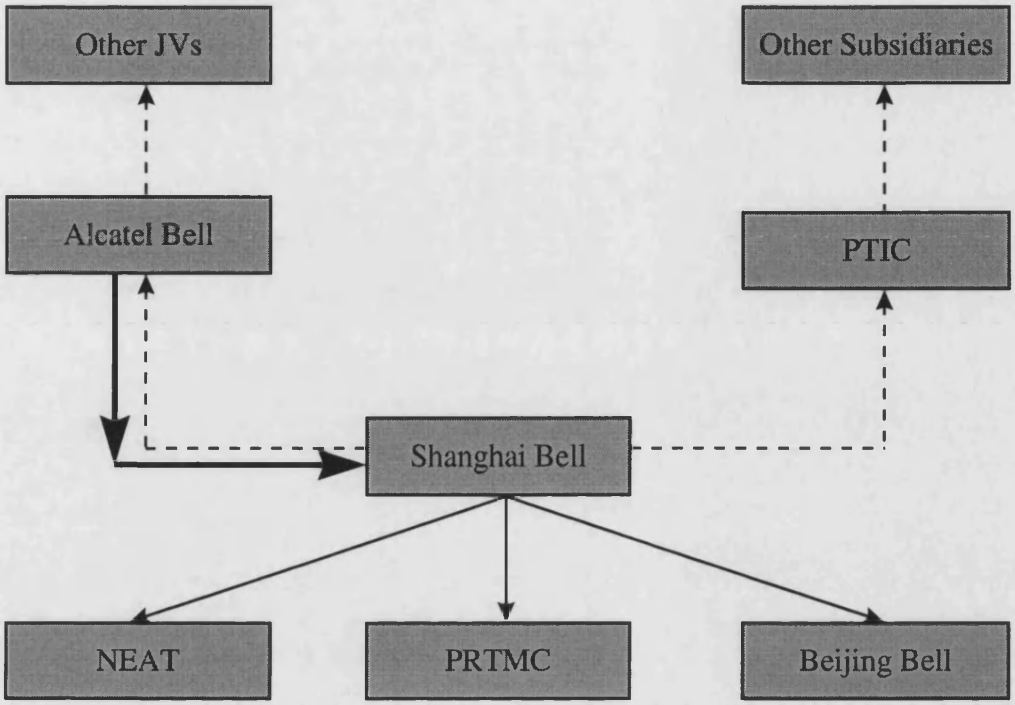
The other avenue through which firms can pursue secondary knowledge transfer is via parents based reverse-learning. Both the Chinese and foreign parents have become not only the recipients but also agents for disseminating knowledge of their

own affiliates. Shanghai VW and Shanghai Bell have been successful among joint ventures in this regard, as illustrated above.

In the following figure (on next page), a more complete picture of the knowledge transfer that has taken place in Shanghai Bell is presented. It firstly includes the knowledge transfer from Alcatel Bell to Shanghai Bell, indicated by a thick line, which is the starting point of the whole knowledge transfer process. The knowledge transfer from Shanghai Bell to its own affiliates, indicated in the thin lines, is part of the secondary knowledge transfer we described above. The remaining part of secondary knowledge transfer includes knowledge transferred from Shanghai Bell to both parents, which can be re-used by the other subsidiaries of the parents of Shanghai Bell. This secondary knowledge transfer also indicates that certain knowledge has been transferred from foreign parent to the Chinese parent via Shanghai Bell, which again is part of the package of knowledge transfer carried out by MNCs in transitional markets.

These two ways of secondary knowledge transfer by the four firms, after completing knowledge transfer and utilisation of themselves, are generally in line with the proposition made by Kogut and Zander (1993: 639) that firms try to exploit their gained knowledge before it is imitated by their rivals.

Figure 7-4: Two-way knowledge transfer in Shanghai Bell



It can be argued that this secondary knowledge transfer can be regarded as the second stage of the evolution process of joint ventures (Shanghai Bell, Shanghai VW and Beijing Jeep) or foreign subsidiaries (Motorola (China) in this study) in transitional markets, after the first stage of purely receiving and assimilating knowledge from their foreign parents. It follows that, theoretically, we can foresee that the next stage of the evolution of these firms is their being knowledge generators, transferring their own knowledge, instead of the assimilated knowledge, to their related firms (affiliates, parents or suppliers), as discussed in the above section. This requires not only the advancement of R&D capabilities in these firms, but also the upgrading of management systems and the creation of corporate entity. No firm in this investigation has reached this stage. It seems to be reasonable that this will follow. Indeed, without aiming such a stage, the knowledge transfer and

organisational learning carried out in the first and second stages of the evolution of foreign affiliates in transitional markets, would only serve short term geographic expansion instead of the long-term building up of the firms' competitiveness in the MNC concerned as a whole.

According to the above discussion, we can come up with a stage model of MNCs' development in the Chinese market according to their knowledge transfer status:
First stage: The transfer and utilisation of the knowledge from foreign parents
Second stage: The further transfer of those utilised knowledge to the related firms
Third stage: The transfer of self generated knowledge to the related firms.

It is worth noting here that organisational learning is an integrated part of the strategic development path of any multinational firm. While a simple knowledge transfer model may apply early on, this will necessarily develop over time into a more complex model incorporating organisational learning. It is important to appreciate that learning is likely to be an objective of the firm. The firm will invest, including foreign investment, in order to gain knowledge. The actions of the firm are to be seen as stepping-stones towards longer-term objectives. These objectives will most likely take it towards more highly developed forms of organisational learning. In the fullness of time, the role of the affiliate becomes rationalised within the multinational group. The affiliate will be restructured to reflect the shift in the balance of the knowledge transfer process as well as the growing emphasis on multinational-wide organisational learning, or referred to as "global learning" by Bartlett and Ghoshal (1989). This will go hand-in-hand with the economics of

supplying regional or global, rather than simply domestic, markets, and the affiliate will become more fully integrated into the organisational structure of the MNC, achieving a full degree of 'technological integration' with its parents (Radosevic, 1998). This represents "the maturing of organisational learning", as we discussed in Section "2.53 Knowledge transfer from the affiliate to the parent".

7.3 The key factors in the knowledge transfer and organisational learning process

This section is a continuation of the discussion on how the transferred knowledge has been utilised by the four firms in this research. Inkpen (1995b: 67) identified trust and relationship openness as the key to long-term, stable, relationship between joint venture partners, and the important elements for achieving long-term success by the affiliate in a new environment. The interview data suggest that the success of Shanghai Bell and the other three firms in the Chinese market was achieved based on a deliberate process of effective utilisation and exploitation of the transferred knowledge. Many factors were found to have contributed to this process. Among others, shared mindset and trust are more important.

Shared mindset

Shared mindset indicates that the partners involved in the joint ventures have a common perspective on aspects concerning the development of the affiliate firm. It incorporates long-term vision that helps to facilitate the smooth knowledge transfer

even when the business runs into serious troubles that may undermine the fundamental rationale of carrying out the transfer process. Shared mindset was gained not only in the negotiation course of the joint venture, but also after facing challenges arising from internal operational problems. Examples here are the "Beijing Jeep Incident", and external (environmental) changes, such as the "4th June Incident" in 1989. The lack of a shared mindset can derail the undertaking of the agreed knowledge transfer programme, pushing the whole business into crisis, as vividly illustrated in the case of Beijing Jeep's foreign exchange problem. This incident arose when the American partner decided to stop cooperation owing to the shortage of foreign exchange in the Chinese affiliate to pay for imported components, leaving the whole firm in a state of disarray. Although essential assistance, in the form of emergency foreign exchange provision and a policy to allow Beijing Jeep to charge local customers in foreign currency, was provided from the Chinese government, the wound could not be healed easily, and still affects the present operation of Beijing Jeep in respect of mutual trust. On the other hand, in the case of Shanghai Bell, Belgian managers showed great flexibility and understanding when the marketing situation of this firm was in a poor state in the middle of the 1980s, and did everything they could to push the business back on track, based on their own expertise in technology and management. At the same time, they sought the sympathy and support from the host government. This experience, which resulted in greater cooperation to solve the problem, enabled the two sides to work together even more harmoniously since then.

However, it is obvious that the shared mindset discussed above does not seem to be important in wholly-owned subsidiaries in that these are under the sole control of the parent and the whole purpose is to implement the strategy of the headquarters. This strategy must be drafted based on a clear understanding of the host market. In the case of Motorola (China), the business strategy reflects the mindset of the management team in its headquarters. This was drawn first by its headquarters in the USA, and then added to by its China headquarters in Beijing (after it was established in 1992), based on the strategic objective of Motorola's business operations in China.

Trust

Trust between partners is the foundation of co-operation. It includes two elements: technical and personal (Chang and Rosenzweig, 1995: 29). In the case of Shanghai Bell, it took several years for the Belgian partner to build up confidence in their Chinese counterpart in terms of technical capability. As commented by the parent's Belgian managers and technical experts during the interview:

> The Chinese engineers in Shanghai Bell are first class. They are not inferior to any engineers in the west.

Due to the technical capabilities of the Chinese engineers, a R&D centre owned by Shanghai Bell was set up in Belgium, just neighbouring Alcatel Bell, working on the projects subcontracted by Alcatel Bell. It also served as a product design department for Shanghai Bell. Similar examples are available in the other three firms, e.g., the contribution of Chinese engineers to the assimilation and adaptation process in

Beijing Jeep. It transpires in this research that the four firms of this research highly regard the technical capability of Chinese engineers they employ. This reflects the great improvement in Chinese higher education since the end of the 1970s, when China chose to embark on extensive economic reform.

Personal trust was also engineered at different levels in the affiliate firm, especially among managers and engineers, as a result of numerous meetings and consultations in the process of knowledge transfer. It is worth noting that this is not easily attained. Sometimes it is very fragile. However, due to the need for cooperation in order to share the risks of 'the joint venture', trust between managers is a precondition of success. Apart from deriving from long time contact, mutual understanding and respect, personal trust can also be established from a situation where equal power sharing has made personal trust essential to keep the company going, i.e., in Shanghai VW, where the equity is shared equally by the Chinese and the German partners, each of the four members of SVW's executive committee has the power to handicap the operation of the whole company by vetoing any motions proposed. Therefore, compromises based on mutual trust and understanding are the natural results of playing to achieve the overall goals of the firm. This confirms the point of Casson (1991: 29) that the ambiguity of control created by a certain type of ownership structure can be used to engineer trust.

It seems that even if foreign partner's equity holding is less than 50 per cent of the firm concerned, as in Shanghai Bell and Beijing Jeep, a mere even balance in bargaining power in negotiation nevertheless exists due to the advantageous position

of the foreign partners as a result of their proprietary assets. They can, as shown in the case of Beijing Jeep, exercise their influence by withholding knowledge transfer (in the case of the Beijing Jeep's foreign exchange crisis), changing technical criteria, and withdrawing expatriates, among others. The Chinese partner with majority control, in each case, has to make compromises in exchange for the continuous support of the foreign counterpart in providing proprietary assets. The non-equity bargaining power enjoyed by the foreign partners in joint ventures has made trust a more important factor in affecting the efficiency of knowledge transfer and utilisation. Only when both the technical and personal trust between the Chinese and foreign partners has been established or engineered, can knowledge transfer be carried out much faster and more smoothly. This confirms our discussion in Chapter 2 that trust needs to be engineered between the partners in joint ventures located in transitional markets, to ensure the smooth transfer, localisation and application of the proprietary assets from headquarters.

7.4 The impact of the Chinese business environment on knowledge transfer and organisational learning

A typical characteristic of transitional markets is environmental uncertainties, including various host government interference in company operations. In Section "2.6 Technology and knowledge transfer to transitional economies", we argue that in the transition economies, research must grapple with knowledge transfer within a setting where institutional and cultural factors play an important role in deciding corporate performance. This different characteristic of transitional economies will

surely affect MNCs' knowledge transfer and organisational learning. In our research, we found market size and access to the Chinese market, government industrial policy, the existence and influence of the Communist Party and its subordinate organisations in the affiliates of those MNCs involved, Chinese culture, the quality of Chinese employees, the rivalry among local governments, and so on, all have had certain impacts on the strategy and behaviour of MNCs in transferring knowledge to the Chinese market and their handling of organisational learning. In the following accounts, we want to specifically examine the impact of cultural awareness, government support and long-term vision on the MNCs' knowledge transfer and organisational learning issues in the Chinese market.

Cultural awareness

Culture, defined by Dutch organisational researcher Hofstede (1991) as the collective programming of the mind which distinguishes the members of one human group from another. With the rise of internationalisation in the 1980s, researchers consider culture as a tool to understand the trend and changes in international business and as a base for building up corporate competitive advantages. Ghoshal and Westney (1993) argue that organisations are socially constructed systems of meaning: they do not have cultures, they are cultures.

Culture is an issue that foreign investors need to take seriously when entering the Chinese market. When asked to judge the merits of the traditional Chinese culture in general, it seems that the interviewees agree that it is good in the sense that it

promotes (1) hardworking which is needed in every firm; (2) collectivism which is in line with teamwork, one of the key principles in modern business operation, and is also good for carrying out disciplines of the firm. But, Chinese culture is not good in that it doesn't encourage individualism, which is an important character for carrying out innovations, and to some extent, organisational learning. These firms thereby have had to train their employees in China to develop their individual creativeness that is badly needed in the long-term development in any new market.

No surprisingly, it is found in this research that an important factor facilitating knowledge transfer in China is cultural awareness of the host market. At first glance it seems very difficult to connect these two together; however, the data collected reveal that they do have a significant linkage. As is commonly agreed, the Chinese market is far different from not only western markets, but also from those of its neighbouring economies – economically, geographically and culturally. Cultural awareness here indicates the understanding of both the traditional Chinese culture and the behaviour of Chinese people, and more importantly, China's political set-up. This is of prime importance in doing business in China. For example, the decision of Alcatel Bell to invest in this market and carry out knowledge transfer, in light of China's poor industrial base, the communist regime and its notoriously changing policy, was not an easy one. However, it demonstrates the importance of cultural awareness with strategic vision which enabled Alcatel Bell to take the risks of transferring knowledge, that other firms tried to avoid doing, handle the difficulties in the transfer process with patience that others did not want to endure, make the compromises in business operation that others would not think about, and reap the

extensive benefits of its involvement in Shanghai Bell, based on the knowledge transfer, that others could not compare with. Moreover, the key factors in transferring and utilising knowledge, such as shared mindset, mutual trust and respect, and team, are fundamentally underpinned by the cultural awareness held by the Belgian partner.

> Different from other westerners, the Belgians have been listening to us and are very flexible, and can compromise if we are reasonable. I think this is partly because their country is very small. Furthermore, they have a very important quality that is badly needed in joint ventures: patience. They have patience and now they have got their reward for it. So I advise other foreigners that they must have patience if they want to invest here and collect a good reward. So, generally, you must have patience, you must be flexible, you must listen to the Chinese when coming to this market. You cannot say I am No. 1 here.
>
> (Ms Yin Linggu, Shanghai Bell)

As demonstrated in the above comments, it is fair to say that cultural awareness is the first step towards success in operating in the Chinese market.

The other three firms also manifested a similar quality of being culturally aware in the Chinese market. Motorola sent in an American Chinese as the general manager of its China operation, it also adopted a fast track management localisation plan, put housing allocation at the core of its employee benefit system (which does not exist in any other subsidiary of the firm), and donated scholarships and financial resources to various educational establishment. Chrysler showed its cultural awareness by agreeing to put the then most advanced model into the joint venture, and instructed its affiliate to restrain from sending any profits back to the USA in the first phase of Beijing Jeep, in order to demonstrate its concern for the serious financial problems experienced by this joint venture in the 1980s. As an experienced international

player, VW did not show any less cultural awareness in its dealing with the Chinese environment and market. It enlisted the support of the German government to persuade the Chinese government to agree to the establishment of a joint venture with a 50:50 equity structure. This was bolstered by a large German government grant towards training local Chinese employees and the sponsoring of bilateral visiting programmes. This is an excellent example of the promotion of "guan xi" between the two countries. The firm has been an active sponsor of major sports events, of educational institutions, and of various projects for helping the poor in inland areas of China, for the purpose of establishing itself as a responsible corporate citizen. This string of facts indicates that cultural awareness should be a key component of any business strategy of MNCs wanting to enter the Chinese market. Firms must take a different approach in doing business in China, underpinned by an understanding, and even an appreciation, of the Chinese culture.

Moreover, the effective development and use of "guan xi", which is regarded to be at the core of the Chinese culture (Davies, 1995; Björkman, 1996; Child and Lu, 1996), is seen as a requirement for the successful establishment of new business ventures and for the effective day-to-day management of Chinese enterprises. Unlike other MNCs of the telecommunications industry, Alcatel Bell knew this from the start. It agreed to establish Shanghai Bell with the then Ministry of Post and Telecommunications, though the official Chinese parent of this joint venture is the Post and Telecommunications Industry Corporation of China (PTIC) which is under the Ministry. This is a wise move for Alcatel Bell as it can guarantee the proper implementation of the joint venture contract and elicit substantial government

support, as will be discussed next section. Alcatel Bell's expatriates were also quick to realise the importance of maintaining "guan xi" with their Chinese partners. One piece of evidence, among numerous of them, is their understanding and cooperation in sending hundreds of visitors annually from Shanghai Bell, its suppliers, customers (local bureau of post and telecommunications) and Ministry and governmental officials, to Belgium in the name of inspecting new product or for attending short "training courses". The truth of the matter is that there is hardly any need for them to go to Belgium from a technical point of view, and these sightseeing-natured visits have been used as a way of rewarding employees by the Chinese. However, it is of great benefit to Alcatel Bell when judging it from a business point of view, as this will greatly enhance Alcatel Bell's relationship or "guan xi" with all the parties it relates.

The other firms in this study have taken a similar stance on building up "guan xi" with government officials, customers and suppliers. Examples of this are Shanghai VW's technical assistance to its suppliers, Beijing Jeep's donation of its products to the Beijing Municipal Government and the Military, and Motorola (China)'s free training and seminars for governmental officials of the Ministry of Post and Telecommunications. As a result of these efforts, these firms have been successful in creating a favourable external atmosphere for doing business, a strengthened capability for localisation and a growing customer base in their respective markets. This is a confirmation of the argument made by Roehrig (1994: 77) that an important strategy for foreign invested firms to elicit favourable implementation of laws, rules, regulations, and policies from local authorities is to establish good, personal

relationships with strategically-located individuals in business, government, and bureaucracy who may be able to influence the outcomes of possible future questions and disputes in favour of the enterprise.

Government support

Government support plays an important role in deciding the success of foreign invested firms in this transitional market. An interesting fact is that most of the firms we visited in the first field trip, and three out of the four firms we visited in the second round, are all joint ventures. That is because, first, MNCs tended to choose joint venture as the entry mode to prevent them from exposure to the uncertainties endemic in this market. Second, Chinese government policy has required that joint venture is the only avenue to be allowed for foreign investors entering into the Chinese automotive industry (assembly sector). The aim is to enable the key technology and management skills be introduced to Chinese partners.

Joint venture is also a way of leveraging direct government support, an important factor in securing success in transitional markets. In the case of Shanghai Bell, the interview data indicate that without the continuous support from both the Chinese and Belgian governments, Shanghai Bell simply could not have survived, let alone achieve the success it has to date.

> Government support is very very important. It's for sure that without government support from both countries, we can do nothing. That's partly the reason why Alcatel Bell preferred to hold minority equity in Shanghai Bell — in this way the Belgian side could get concrete local government support. Regarding the support from the Belgian government, it was Alcatel Bell's initiative to ask the Belgian government to take an equity stake in this joint

> venture (in order to facilitate growth by way of inter-governmental co-ordination), however playing an unofficial role in the managing of this joint venture. The Belgian government did exactly in this way.
>
> (Mr Jos Caerts, Alcatel Bell)

The government support received by Shanghai Bell mainly comprises: 1. From Belgian government: interest free loans, free training programmes (technical and management) for Chinese engineers and managers, and more importantly, inter-governmental co-ordinations for issues like technology transfer licenses, which the firms concerned could do nothing about; 2. From the Chinese government: as the main shareholder of this firm, the Chinese government (at both central and local levels) has done everything it can to nurture the formation and growth of Shanghai Bell, from capital injection, manpower provision (facilitating supply of qualified workers), to government procurement, direct subsidy where the Chinese government paid the local customers the difference between the higher price of Shanghai Bell's products and those of its competitors during 1986-1989, localisation encouragement, and so on.

> As I mentioned before, this project, listed as one of the key national projects, has always enjoyed the endorsement of the Chinese government. The Ministry of Post & Telecommunications even set up a special department, called System 1240 Bureau, for the development of this project.
>
> (Ms Yin Linggu, Shanghai Bell)

Government support proved to be the lifeblood of Shanghai Bell in her early years when struggling for survival and on-going knowledge transfer, and still has a big stake in the success of Shanghai Bell's development, based on the fact that the (Chinese) government organisations are the primary purchaser of Shanghai Bell's products.

Government support has also been cited as the chief external factor affecting knowledge transfer and utilisation in the other three firms. But, unlike in the case of Shanghai Bell, where both central and local governments are direct stakeholders, local governments have played a nurturing part in the establishment of these firms. Due to the size and leading importance of these firms, the local governments concerned (Shanghai, Beijing and Tianjin) have regarded the development of Shanghai VW, Beijing Jeep and Motorola (China), respectively, as the locomotive of local economic development. The projects to upgrade and expand these firms have been made priorities (sometimes named as "No. 1 project" in various year) of the cities concerned. Government supports of this nature has ensured the allocation of badly needed resources to these firms, the opening of local markets to their products and, most importantly, the provision of a high status. This contrasts markedly with the normal reputation of state-owned firms, which are well known for being bureaucratic and often corrupt.

The case of Beijing Jeep is illustrative in understanding the influence of government support (including interference) on the firm's performance. As the first joint venture in China's automotive industry, Beijing Jeep enjoyed far higher attention and benefits from the government than later ones, especially in the early period of its operation. Government support not only means favourable tax treatment, preferential bank loans, government purchasing, and so on, but also, in the case of China where governmental intervention into firms' business is extensive, a favourable operating environment. At the same time, Beijing Jeep also experienced various difficulties from the old command-based economic system, e.g., shortage of foreign exchange

(which was resolved finally by the involvement of the Premier of the Chinese government), various barriers to import components, government bureaucracies, and so on. Beijing Jeep, even as a joint venture, has to subject itself to the government's control and intervention, in a very similar way to that incurred by state-owned firms. One example is that the China Automotive Industrial Corporation, the main Chinese equity holder of Beijing Jeep, chose all the major managing directors reserved for the Chinese based on very vague criteria largely unrelated to merit, but more related to personal connections, which did harm to this firm. Another example is that, when Beijing Jeep applied for a license to produce a new passenger car developed by Chrysler in the beginning of the 1990s, the chief decision maker (a government vice premier) in this sector vetoed it. This has been seen as a classic case of the political influence on firms' operations. So, both positively and negatively, the case of Beijing Jeep vividly exemplifies the importance of government support in running a joint venture in a highly regulated economic system.

Chinese government's enthusiasm for supporting FDI into key industries at considerable expense was in general due to the Chinese government policy of promoting knowledge transfer from western investors, and also a result of local rivalry among municipalities and provinces. To some extent, local rivalry is a driving factor. As a matter of fact, competition among local governments has always been a characteristic of Chinese politics. Officials of local governments have used the record of economic development as a way of gaining promotion. The progresses made in terms of FDI in key industries in respect of knowledge transfer and utilisation are seen as especially impressive, since the economic reform and opening

policy carried out from the end of 1970s. Both the telecommunications and automotive industries are the so-called pillar industries, designated to be so by the central government a decade ago, and their importance in leading economic development is clearly tangible. This is the main reason why Shanghai (where Shanghai Bell and Shanghai VW locate), Beijing (where Beijing Jeep locates) and Tianjin (where Motorola (China)'s production base locates) are the top three municipalities inside China. They have pursued the growth of the firms in this study relentlessly, by using all the possible resources to hand in the past one and a half decades. These firms have enjoyed treatment and resources that other multinationals might not be able to access. Therefore, these firms' experience and success in knowledge transfer and business operation cannot be expected to apply to every FDI in China due to this discriminatory treatment. To date, Chinese government support has been selective but nevertheless powerful when FDI falls into the designated priority categories of the host local governments. As a result, investing in China is highly distinctive. This is in support of our argument in Section "2.6 Technology and knowledge transfer to transitional economies", that institutional and cultural factors play an important role in deciding corporate performance in the transition economies. It is also a confirmation of our description regarding the uniqueness of the Chinese socialist market economy in Section "3.2 Features of the Chinese business environment". The importance of government support indicates that foreign investors must pay particular attention to macro-environmental factors when doing business in China (Yip, 1995).

Long-term vision

All the firms of this research have shown a common character – long-term vision – in dealing with the challenges and problems of the process of knowledge transfer and organisational learning. This long-term quality may be manifested by a long-term commitment to China, deriving from the future potential and absolute size of the Chinese market. This includes making compromises to smooth cooperation, e.g., the gradual increase of the American shareholding in Beijing Jeep from 31.5 per cent to 42 per cent; various training programmes, which is an investment in employees; sticking to the market even when the immediate prospect of business was in difficulty, e.g., the troubled initial operation of Shanghai Bell (continuous deficit for the first four years) and the overcoming of the shortage of foreign exchange (which forced Beijing Jeep to stop production for several months); and the reinvestment of all the profits into production and training in the initial period. In respect of the last point all the four firms, Shanghai VW, Shanghai Bell, Beijing Jeep and Motorola (China), had ploughed in funds and reinvested earnings over several years into production expansion, demonstrating its long-term interest in the Chinese market. For example, Motorola (China) had not only invested US$1.2 billion of new capital in China and reinvested all its profits from its Chinese operations back the country, but also committed to invest an additional US$1.3 billion by the end of 2000 (China Daily, 14th January 1998).

Long-term vision has proven to be a key point in relieving the friction caused either by the differences between partners, or by the unpredictability of the Chinese

business environment. Long-term vision may not be a characteristic enjoyed by every foreign investor, but it is a prerequisite for successes in dealing with the Chinese market. As commented by a senior manager of the parent Alcatel Bell:

> Long-term vision and flexibility of the Belgian partner in Shanghai Bell has nothing to do with Alcatel Bell. They are part of the qualities of the Belgians. The reality is that Belgium is a small country (with a small internal market) and we have to export 65-75 per cent of our products in order to survive. Alcatel has got seven joint ventures in China and all of them (except Shanghai Bell) are in loss. So the difference is between the Belgians and the French. The reason you have to keep patient and long-term vision is simple: if you have been there you have to stick there for the potential of that market to become a reality."
>
> (Mr Chris Morel, Alcatel Bell)

In general, long-term vision, plus strong financial resources, along with a shared mindset, trust and dedicated teams, seems to be more important than any other strategies in facilitating knowledge transfer and organisational learning, and realising business expectations in the Chinese market. Long-term commitment, willingness to transfer technology, and an ability to partner either with local firms through joint venture or close relationships with overseas Chinese firms are considered crucial for success. Czinkota and Ronkainen (1997) argue that the lack of predictability of Chinese demand and the missing legal infrastructure will eventually be worked out through market forces and future development of corporate law. The firms that have entered the Chinese market earliest clearly have had to demonstrate more ability to overcome problems than those that will come later.

Actually, long-term vision is closely related to how to judge the performance of affiliates in foreign markets, especially in the case of international joint ventures. Only when they are happy with the performance of the affiliates, or they believe

there is the prospect of a long-term reward, would foreign parents lend their total supports to, and invest additional resources in, these joint ventures. Therefore, long-term vision is dependent on the calculation of long-term returns from foreign affiliates. The fact that they stick to the market even when the immediate prospect for business is difficult, e.g., the initial operation of Shanghai Bell (continuous deficit for the first four years) and the foreign exchange problem faced by Beijing Jeep, demonstrates that the calculation of long-term returns from foreign affiliates carried out by foreign parents is not objective, in terms of short-term financial results. Rather, it is quite subjective, i.e., based on the understanding of the targeted market, e.g., business practices, culture, political and economic environment, industrial and human resources by the foreign parents. This demonstrates that the performance of an international joint venture in transitional markets has been preferentially assessed subjectively (in the opinions of the parents), rather than objectively (in terms of financial results). Indeed, the long-term vision shown by the foreign parents, which was based on the subjective estimation of the long-term business prospect of the affiliates concerned, has ensured the foreign partners their chance of reaping great returns five or ten years later. The following is a description of the returns for the parent Alcatel Bell's continuous involvement in Shanghai Bell based on its long-term vision demonstrated when this affiliate was in deep trouble in the middle of the 1980s:

> Here is a very simple graph that shows the return on the investment of the partners of this firm. It is clear that if investing $1 in 1984, then $25 is the return now [in 1997] including bonus, profit, dividends and net assets. This is a very high return. This is only the first part of return actually. The second part of the return is that the Belgian side can increase their export of parts greatly as our scale of production is so huge. The third part is that they can increase their business scope in China based on the success of Shanghai Bell. Apart from Shanghai Bell, Alcatel Bell has set up another six or seven JVs with the

> Ministry of Post and Telecommunications in the Chinese market, such as the Wafer Plant and so on. Why have they been so successful? Because there is such a sound example of Shanghai Bell here."
>
> (Ms Yin Linggu, Shanghai Bell)

A conclusion from our above discussion is that long-term vision is conditional, depending on the subjective assessment of the long-term returns from the foreign affiliates. The causes of these returns are multifactoral, but an important part is played by market size and growth, as argued in the theory of international business – for example, the optimum market servicing strategy model of Buckley and Casson (1985). However, to this we must add not just the importance of good relations with the government, but the understanding that good relations are key to successful operation in China.

7.5 The improvement of firms' competitiveness as a result of knowledge transfer and organisational learning

The aim of knowledge transfer and organisational learning is to improve the competitiveness of the recipient firm. There is a whole package of indicators, developed by Buckley *et al* (1992), to measure the changes of firm's competitiveness in terms of competitive performance, competitive potential and management process. There is no question that the firms visited are now much more competitive than when they were established, based on the advanced production and management systems transferred from the west — lots of evidence have proved that. For example, one senior manager listed the improvements of competitiveness in Shanghai Bell as follows:

> Based on the excellent cooperation between the partners, we have now enlarged our line of business to include mobile telecommunications, standard rack of GSM, series products for Wide Band Information Highway, software products and intelligent net, and also the technology of chip production. Actually some engineers of Shanghai Bell are participating in the research and development of next generation telecommunications products, such as the wide band information highway and CLSI chips. This firm now has become a whole-service provider in its area, i.e., some R&D, production, installing, testing and maintenance. It is very advanced from a manufacturer's point of view.
>
> (Mr Zheng Yulu, Shanghai Bell)

Clearly the case of Shanghai Bell is a typical stage model development of line of business referred to by Chang and Rosenzweig (1995). Its participation in the research and development of next generation telecommunications products coordinated by Alcatel Bell is in line with the organisational learning theory (especially learning by designing) discussed by Lall (1980). The horizontal (expansion of line of business) and vertical (from no R&D to participating in joint R&D) development in this firm is powerful evidence of the impact of knowledge transfer and utilisation in transitional markets. Because a similar route of expansion has been found in all the other three firms as well, we can conclude that the competitiveness of the foreign affiliates in their first stage in transitional markets can be judged as the result of knowledge transfer and utilisation.

What interests us is not only the improvements of competitiveness in general terms, but also the present situation of the four firms in all the three categories of firm's competitiveness, i.e., competitive performance, competitive potential and management process. Having reassessed the measures proposed by Buckley *et al* (1992:18-19), which are mainly used to compare the competitiveness of firms

servicing international markets, we have chosen only the most relevant measure in each category to enable an objective, but simplified, comparison among these four firms which are primarily targeting the Chinese market[38]. The measures include: market share in competitive performance, R&D in competitive potential, and management relations (motivating and organising the employees inside the firm and maintaining good relations with outside stakeholders in the Chinese market) in management processes.

According to the information collected in relation to the present situation of these firms in the above categories in the Chinese market, a general description of their competitiveness can be given in the following table:

Table 7-1: The present competitiveness for the four firms in the Chinese market

	Competitiveness		
Firm Name	Performance	Potential	Management process
Beijing Jeep	A	W	A
Motorola	S	S	S
Shanghai Bell	S	A	A
Shanghai VW	S	A	A

Note: S - Strong; A - Average; W - Weak[39].

We found that two of the three joint ventures, Shanghai Bell and Shanghai VW, are very strong in "competitive performance" in terms of market share, where Shanghai

[38] The Chinese market is an international market for the foreign investors. Also, international joint ventures and wholly-owned subsidiary are forms of international business. Therefore, the measures proposed by Buckley *et al* (1992) can be applied here.

[39] This is in line with the scaling system used by Inkpen (1995b: 135) and Swaan (1995, in Radosevic, 1998: 25) in categorising the performances and other case characteristics of different firms. "Strong, average and weak" are qualitative measures. They are used to differentiate issues which are either not quantifiable in nature, for example, competitiveness, management process, organisational change, leadership, organisational learning outcome, etc., or too complex to be quantified, for example, competitive performance and competitive potential are underpinned by a group of indicators and it is very difficult to decide the right formula for gauging them exactly.

VW has seized just more than 50 per cent of the Chinese car market since the end of the 1980s (according to Mr Cheng Gang of Shanghai VW and Shanghai VW's annual reports), and Shanghai Bell occupied about one third of the total telephone exchange equipment market in the last several years, increasing from about 25 per cent at the beginning of this decade (Alcatel Bell's internal document, 1998: P.II/10). However, they are not so outstanding in "competitive potential" and "management process" — an indication of the improvement of their rivals, both other foreign invested firms and China's indigenous industry, a lack of solid self R&D capability, and the decreasing of government support owing to the increase of FDI in these two industries and the change of Chinese industrial policies.

If Shanghai Bell and Shanghai VW want to remain key players in the Chinese market, it seems much more needs to be done to promote management effectiveness and strengthening its R&D capabilities, which is the main indicator of competitive potential. Beijing Jeep, once a big cash cow at the end of the 1980s, on the other hand, is now scored lower in all the three categories than the two fellow joint ventures, leaving itself very little space to manoeuvre. This reflects the relatively poor performance of this firm in the current difficult Chinese automotive market: only occupying about 6 per cent of the total Chinese car market in 1996, according to "Automotive industry of China" (1997: 38); and since then, market demand for its main products declined, which made Beijing Jeep in a very uncomfortable situation. Beijing Jeep's handicapped R&D capability is also an underlying source of weakness. Motorola (China), a full member of Motorola family, is the highest ranked among the four. Inheriting its strength directly from its parent, Motorola (China) is now at the same level as Shanghai VW and Shanghai Bell in terms of "competitive performance", based on the track record that it is one of the main providers of mobile phones. Its market share in mobile phones is estimated at 25 per cent of the total market in 1997 by Mr Liu of Motorola (China). Even more outstanding is the firm's "management process" and "competitive potential", if

compared with any of the three joint ventures. The secret of its success was clearly stated by one senior manager of this firm, Mr Lee Liu:

> In general, if we have been successful, that's because, apart from others [some of them have been mentioned above], we have a sound business strategy first, and then concentrate on the organisational building up. Our competence comes from not only every bit of the firm (such as advanced technology), but also the whole firm — integrated organisation. Motorola is very competitive in all the aspects of a firm: technology, management, and more important, corporate culture. If you want to understand Motorola, you have to understand its culture first.

The reason why the three joint ventures scored lower than Motorola (China) in "management process" and "competitive potential" lies in the fact that the Chinese employees of these firms are still strongly influenced by the mindset of Chinese state owned firms, e.g., relying on governmental preferential treatment, providing employees with a whole range of welfare benefits, paying less attention to R&D, concentrating on production volume instead of efficiency, and the strong influence of the Communist Party organisations on the business operation process. However, differences can still be found among them in these three categories. It seems, the general tendency is that the higher the foreign ownership, the higher the score of the firm's competitiveness. Shanghai VW, with its equity 50 per cent owned by VW, gained the best results among the three firms, presenting a stark contrast with Beijing Jeep in all the comparable areas, although the latter was earlier in setting up the joint venture.

> The improvement of our competitiveness after knowledge transfer and utilisation lies in the following aspects: 1. Financial improvement. This has been the result of our rising rate of localisation that therefore reduces the tariff on the imported parts, which is now less than 10 per cent of the total. These are mainly those not worth localising. The key technologies relevant to Santana have all been transferred and localised. 2. Multiple brand products. This has ensured that Shanghai VW keeps its momentum in competition. Shanghai VW is now holding a bit more than 50 per cent of the total Chinese car market, and one of the biggest firms in China. 3. Excellent after sales

services. But, if compared with FAW (First Automotive Works), Shanghai VW lags behind in R&D.

(Mr Cheng Gang, Shanghai VW)

The key variable in the category of "competitive potential" is the strength of R&D. Knowledge transfer is thought to be an effective way of improving the R&D strength of MNCs' affiliates in transitional markets. But, a surprising finding from the data is that the cloning process (a copying process of parent knowledge assets through knowledge transfer and utilisation) in these joint venture affiliates has not greatly improved their self R&D capability, as in the case of Shanghai Bell. Indeed, to some extent, the transfer of knowledge assets seems even to have paralysed their capability of self-R&D, especially so in the case of Beijing Jeep.

Before proceeding to examine the reasons responsible for the slow development of self R&D in the three joint ventures, we want to establish why these joint ventures wished to have their own R&D capabilities in the first place. Reflecting the strategic motive of the Chinese government in utilising FDI as a chief avenue of transferring to China the latest technology and management skills, as discussed in Chapter 6, the Chinese partner has always regarded the development of self R&D, linked to the current advanced products introduced by the western partners, as tangible evidence of knowledge transfer and utilisation. Foreign investors were required to commit themselves to contribute towards this goal if they wanted to get access to the Chinese market through joint ventures.

A capability in self-R&D can also help the Chinese partners to revitalise the relevant state-owned firms and increase their competitiveness internationally. Moreover, such

a capability can also halt the heavy technological reliance of the Chinese side on the foreign partner, and, as a result of that, create opportunities for great savings by switching key component supply from the foreign partner to local manufacturers (provided the latter can provide the same quality products at a much cheaper price than the former). Foreign investors, on the other hand, have to deliver some substantive outcome in this regard in order to establish trust between the joint venture partners and seize more future opportunities in an increasingly important market. Emerging from such a scenario, both sides of the joint ventures concerned accept that self-R&D capabilities need to improve, sooner or later, to achieve their individual goals.

There is certainly a need to discuss the barriers to self R&D, or why the self R&D capabilities of these joint ventures have not been properly developed as expected, following the knowledge transfer and utilisation. It seems no common reasons can be given. We can divide these four firms into several categories:

Before knowledge transfer and utilisation:

Firms with some self R&D capabilities include: Beijing Jeep, Shanghai VW

Firms without self-R&D capabilities include: Motorola, Shanghai Bell (both started from scratch)

After knowledge transfer and utilisation:

Firms with R&D capabilities developed: Motorola, Shanghai Bell and Shanghai VW

Firms with R&D capabilities paralysed: Beijing Jeep

These are shown in the following table:

Table 7-2: The impact of knowledge transfer on affiliates' R&D capabilities

	R&D Before Knowledge Transfer		R&D After Knowledge Transfer	
	some capabilities	no capabilities	developed	not developed
BJ	✓			✓
SB		✓	✓	
SVW	✓		✓	
Motorola		✓	✓	

In the case of Motorola (China), though a new establishment, as part of the Motorola empire, a networked R&D strategy has been applied since its birth, i.e., the headquarters co-ordinate the whole firm's R&D strategy, while Motorola (China) develops its capabilities in a handful of chosen areas, e.g., semiconductors, mobile phones. In practice, Motorola (China) has not only set up its own R&D facilities inside its production site in Tianjin, but also carried out a comprehensive strategy of cooperating with China's renowned universities, research institutes and companies (see the profile of Motorola) to utilise these resources for the purpose of maximising of its research output in China. All the research projects carried out serve as part of its overall R&D strategy and are for Motorola's global market, and do not, as many would assume, serve the Chinese market alone.

This has not happened in Shanghai Bell, where the imperative of undertaking adaptations to meet the specific needs of the Chinese market, and the shortcomings of S12 itself, have allowed the space for the affiliate to develop its own R&D. However, the truth of the matter is that this firm has done little in terms of R&D to compete any wider than the Chinese market, due to its protected market status in

China, and of the culture inherited from the central planning system. As commented by one senior manager of the parent Alcatel Bell on this:

> When the production volume is six million lines a year and the joint venture's major shareholder and the biggest customer is MPT (Ministry of Post and Telecommunications), why should they worry about the next generation products?! In a one billion people market, it is not difficult to find customers. What they try to do is to extend the life cycle of the present products, which is wrong.
>
> (Mr Chris Morel, Alcatel Bell)

The protected market condition created by government support and a lack of motivation among the management team has therefore blocked the full release of the R&D potential of Shanghai Bell even after the extensive knowledge transfer and utilisation.

In the case of Beijing Jeep, it is the low efficiency of localisation that has seriously handicapped the development of its R&D capability. While striving to establish self-R&D capability through joint venture operations, Beijing Jeep has never managed to address this since its establishment in 1983. The huge technology gap between this joint venture and its American parent, and the increasingly hasty upgrading of its existing products in Chrysler, mean that Beijing Jeep has no time to "breathe", but was obliged to immerse itself in a continuous process of digesting and adapting product innovations from abroad. The deterioration of the market situation in the 1990s contributed to the financial difficulties of this joint venture in undertaking any new research and design. The result is that Beijing Jeep did transfer some technologies to its old models and carried out extensive modifications on its main product range, Cherokee XJ, but has never been able to develop new generation

product of this series either jointly or independently. This leaves Beijing Jeep in a situation of dependent development, i.e., as a passive producer of American products according to American design, as extensively discussed by Zhang (1995: 33). So, as far as R&D capacity is concerned, it seems that Beijing Jeep has made very little progress.

The huge differences among these four firms in terms of their improvements in competitiveness, as discussed above, were identified by employing the benchmarking indicators developed by Buckley *et al* (1992). Combined with this is the assessment reached by the individual parents of the respective firms. It appears that the verdicts of the parents on the performance of each international joint venture differ wildly. The Chinese parents of the two joint ventures, Shanghai Bell and Shanghai VW, seem genuinely happy with the performance of these firms, which can be demonstrated by continuous government supports, various honours based on their performances, and frequent visits by key government figures. Beijing Jeep, however, has been under criticism from its Chinese parent on its failure to upgrade its own R&D capabilities after a decade-long knowledge transfer and utilisation (e.g., Zhang, 1995) and its poor performance incurred since the middle of the 1990s. This can be demonstrated by the frequent removal of the Chinese management team in this firm and the refusal of Beijing Jeep's application by the Chinese government for extending its current product range (off road car) to include the latest sedan developed by Chrysler.

> Government support is crucial in doing business in the Chinese market. But government only supports you when you are doing well. Beijing Jeep has not done very well in the past several years and would like to make a big change in its product range. However, when Beijing Jeep applied for a license to produce

> a new car developed by Chrysler, it was vetoed by Vice Premier Li Lanqing. This is evidence that the central government is not happy with the performance of Beijing Jeep.
>
> (Ms Sun Ying, Beijing Jeep)

On the other hand, foreign parents view the performance of these affiliates from a different angle. In addition to the financial aspect of the firms concerned, it appears that the foreign parents highly regard the progress made in building up their long-term positions in the host market. Factors contributing to long-term success are judged as more important than the recent financial figures. This different perspective in assessing the performance of affiliates in the Chinese market by foreign parents is illustrated in the following comments, made by a senior manager in Alcatel Bell, the foreign parent of Shanghai Bell:

> Financially, the return from Shanghai Bell is exceptional. But, in terms of technology and engineering capability building up, we have lost heavily because we lost the opportunity of building it in time. The reason for that is that the market situation has been so wonderful that the Chinese side just don't listen to you. We have no choice. We should build up much faster the local engineering capability of Shanghai Bell.
>
> (Mr Chris Morel, Alcatel Bell)

It indicates that Alcatel Bell is not happy with the performance of Shanghai Bell in respect of its R&D capabilities, even though the current financial return is excellent.

The Alcatel Bell view of performance appraisal is discernible in the other two joint ventures as well[40]. For example, even though Shanghai VW has occupied more than

[40] Due to financial and time constraints, we were unable to visit the foreign parents of the other two joint ventures, i.e. Shanghai VW's foreign parent, VW in Germany, and that of Beijing Jeep, Chrysler in the United States. However, their judgement of the respective joint venture performance can be gauged through interviews with the foreign expatriates in these joint ventures and commitment to the affiliates. This is in consistency with the grounded approach (Glaser and Strauss, 1967) on which this research is based.

50 per cent of this emerging car market and is the most profitable firm in China's automotive industry, VW is worrying about the future competitiveness of Shanghai VW, due to its high unit costs and limited product range in the Chinese market, if and when China is admitted into the World Trade Organisation:

> This firm is not going to repeat its current success once China is admitted to the World Trade Organisation (WTO) and barriers for importing foreign cars have to be greatly knocked down. Seriously, we are very worried. Why? Look at the cost per unit here and the similar product made in Europe. And look at the unit cost of components supplied by local manufacturers..... We can do something on our own, but, we cannot close all the gaps arising from the difference in respect of the productivity of component suppliers. Shanghai VW is doing well with the support and protection from the Chinese government. Then what if all the doors are open [when China is admitted into WTO]?
>
> (Mr Wolfgang Rohroff, Shanghai VW)

Chrysler, however, has sought every chance to increase its equity stake in Beijing Jeep from 31.35 per cent in 1983 to 42.4 per cent in 1994, a statement of its strong confidence in the future of Beijing Jeep (and an attempt to improve management control), although this affiliate has been embraced with continued stagnant market demand in the 1990s, leaving itself the least profitable among the big car manufacturers in China.

The reason behind this variation in the assessment of affiliate performance by the Chinese and foreign parents is that the different parties have different objectives within the joint ventures. The Chinese parents put knowledge transfer, import substitution and the setting up of competitive firms in "pillar industries", as the key criteria for assessing the performance of their joint venture affiliates, and any progresses made on those fronts would please them. Conversely, the foreign partners are more concerned with market share and the long-term benefits of staying in this

market. Long-term profitability would be regarded as more important than short-term high returns. This is what long-term vision is all about, as we discussed in the preceding sections. Hence, it is right to say that, due to the different objectives, the performance of international joint ventures in transitional markets has to be preferentially assessed subjectively (in the opinions of the parents), rather than objectively (in terms of financial results).

In general, the data collected indicate that after carrying out knowledge transfer and organisational learning, the four firms in this research have all improved their competitiveness in the Chinese market. It is fair to say that without knowledge transfer and utilisation, the four firms would be unable to compete successfully with other foreign invested firms and indigenous rivals. Buckley *et al* (1992)'s terminology proved to be useful in measuring the improvement of the competitiveness of these firms in that it can gauge the differences between them in the three categories of comparison. However, this research finds that the performance of the affiliates in the Chinese market was also measured subjectively by the Chinese and foreign parents in relation to their respective objectives in engaging in the joint ventures. This is a further indication of the complications of doing business in the Chinese market.

7.6 Summary

The remaining two research questions, i.e., how has the transferred knowledge been utilised and what is the impact of the Chinese business environment on the process

of knowledge transfer and organisational learning by FDI, have been dealt with in this chapter. This has been conducted by closely following the relating discussions in Chapter 2, as demonstrated in the following table (on the next page).

First, this chapter further examined the process of organisational learning carried out in four multinational affiliate firms in China and its impact on these firms' competitiveness in the Chinese telecommunications equipment and automotive markets. It has been confirmed that utilising the transferred knowledge is a learning process carried out in the knowledge recipient firms in China. In addition to the earlier stage of knowledge transfer, as already discussed in the previous chapter, this learning process comprises knowledge articulation, knowledge application, and knowledge dissemination. Knowledge application is further divided into training, copying and adapting. And knowledge dissemination consists of secondary knowledge transfer from these four firms (which previously received transferred knowledge from their foreign parents) to their own affiliates, and further knowledge transfer from these four firms to their Chinese and foreign parents – a practice in this research referred to as 'reverse-learning'. Key elements that are significant in this process include training, team, and absorptive capacity. Training ensures the provision of qualified staff and the dissemination of parental corporate culture. Teams need to be created, maintained and enhanced, as they are the "joints" to underpin, or operationalise, knowledge transfer and organisational learning. We have also seen that teams are central to the absorptive capacity of the recipient. In addition, one way of improving the absorptive capacity of the knowledge recipient firm in transitional markets is through the grafting of individuals.

Table 7-3: Correspondence of Literature Review and Analytical Chapters.

Literature Review	Analytical Chapter	
Section 2.5-2.7	Chapter 7	Last two research questions
2.5 From knowledge transfer to organizational learning	Chapter 7 From knowledge transfer to organisational learning: Knowledge utilisation by FDI in China's telecommunications manufacturing industry and automotive industry	
2.51 The utilisation of the transferred knowledge: An organisational learning perspective	7.1 Introduction	
2.52 The process of organisational learning	7.2 The process of organisational learning 7.21 The process of organisational learning: An overview 7.22 Articulation 7.23 Application 7.24 Dissemination: Further knowledge transfer and organisational learning 7.241 Further knowledge transfer from the four firms to their own affiliates	Question No. 3: how has knowledge been utilised
2.53 Knowledge transfer from the affiliate to the parent	7.242 Further knowledge transfer from the three joint ventures to their Chinese parents 7.243 Further knowledge transfer from the three joint ventures to their foreign parents	
2.54 Extending the analysis	7.244 A refined stages model of MNC evolution in transitional markets	
2.6 Technology and knowledge transfer to emerging economies	7.3 The key factors in the knowledge transfer and organisational learning process 7.4 The impact of the Chinese business environment on knowledge transfer and organisational learning 7.5 The improvement of firms' competitiveness as a result of knowledge transfer and organisational learning	Question No. 4: what's the impact of the Chinese business environment on knowledge transfer and organisational learning process
2.7 Summary	7.6 Summary	

An objective indication of the successful utilisation of the transferred knowledge is the further transfer of the gained output knowledge from the firms concerned in this study to their own affiliates in the Chinese market, and to their Chinese and foreign parents by reverse-learning. This is a way of consolidating firms' competitiveness in the transitional markets. Knowledge obtained through reverse-learning by the foreign parents from their affiliates can be re-used in later market entry by other affiliates of the same parents in the Chinese market. Based on the evidences of knowledge transfer and organisational learning in the recipient firms, we proposed a three-stage model of MNC evolution in transitional markets, which leads to an improved understanding of the process of the capability development of the foreign invested firms in the Chinese telecommunications manufacturing industry and automotive industry.

Two factors were identified to be the cornerstone of managing the process of knowledge transfer and organisational learning in the three joint venture recipients: shared mindset and trust. In the face of the complexity of economic and cultural differences between foreign and local investors, this study concludes that a shared mindset needs to be cultivated, and trust needs to be engineered between the partners, in joint ventures located in the Chinese market, to ensure the smooth transfer, assimilation and application of the proprietary assets from headquarters.

Second, this research agrees with the contention that the Chinese business environment has impacts on the management behaviour of MNCs that engage in

knowledge transfer and organisational learning. Cultural awareness, government support and long-term vision were found to be linked to carrying out knowledge transfer and organisational learning in the Chinese business environment. The evidence from this research is that they influence the strategy and behaviour of the four MNCs in transferring knowledge to the Chinese market. This is in line with the findings of a recent survey conducted by KPMG (1999), which concludes that "Culture and mentality have been a constant source of trouble to the German enterprises" due to poor understanding of Chinese partners and the Chinese business environment. Although the KPMG study did not research knowledge transfer and organisational learning, it is possible that (as they are dimensions of success factors) these were impaired as a result of these inter-partner problems. As our four affiliates in China are very large, it is reasonable to infer that the substantial commitment and resources of the parents were effective in addressing the barriers of cultural difference and mentality. This would contrast with the experience of the firms in the KPMG survey, which were of considerably lower average size.

Third, this chapter also examined the impact of carrying out knowledge transfer and organisational learning on the competitiveness of the MNCs' affiliates in the Chinese market. The competitiveness of the foreign affiliates in their first stage in this transitional market can be judged as the result of knowledge transfer and organisational learning. It has confirmed that this can be measured by various indicators of the firm's competitive performance, competitive potential and the management process (Buckley *et al*, 1992). It seems likely that there is a positive relationship between the performance of knowledge transfer and organisational

learning, and that of firm competitiveness. However, a note should be struck here. Due to the differing objectives, the performance of an international joint venture in the Chinese market has been preferentially assessed subjectively (in the opinions of the parents), rather than objectively (in terms of financial results).

Finally, having compared the practices of knowledge transfer and organisational learning of these four firms in China's telecommunications manufacturing industry and automotive industry, we can see the common themes among the four firms in this investigation. These are how to carry out organisational learning effectively to achieve an improved and sustainable firm performance in the Chinese market, how to deal with the environmental uncertainties presented by the host market in the organisational learning process, and how to adapt appropriately to the local culture.

There are, however, some differences emerging between these four firms. In most instances the contrasts arise between the wholly-owned subsidiary of Motorola (China) and the joint ventures, i.e., Shanghai VW, Shanghai Bell and Beijing Jeep. Unlike the joint ventures, there is no documentation or translation centre in Motorola (China). The way of overcoming language problems in this firm is through very selective recruitment and training programmes. However, training in Motorola (China) is more systematic and intensive than in its joint venture counterparts. This is essentially a reflection of the different beliefs between them. Motorola regards training as part of its firm competitiveness, with Motorola University at the centre of its corporate identity, while all the joint ventures use training as a means to achieve

their respective firm competitiveness. Regarding copying from foreign parents, Motorola (China) started with the production of three products, while the three joint ventures each only started with the assembling of one product. The three joint ventures began the localisation of manufacturing by adapting the easier elements first. This 'from-easy-to-difficult approach', however, was not found in Motorola (China), where, from the very beginning, the final products as well as some components were produced simultaneously. Moreover, some research centres (the software centre, mobile telecommunications products centre, manufacturing technology research centre and paging research and development centre) were established roughly at the same time as the production lines, in order to facilitate the further development and adaptation of the current product range. This demonstrates that a difference in cultivating R&D in the process of organisational learning exists between the four firms. Motorola (China) has integrated R&D development with its organisational learning, while the three joint ventures took a different approach by nurturing their adaptation capability first and placing independent R&D second.

Differences were also evident in respect of further knowledge transfer to the foreign parents. Only the three joint ventures qualify for the categorisation of reverse knowledge transfer discussed in this section, while Motorola (China) does not because it has carried out all the subsequent expansions in China. This is not to deny the fact that Motorola as a whole benefited hugely from the acquisition of local knowledge and newly created knowledge by Motorola (China) in the Chinese market. The point is that as Motorola (China) implements the strategies devised by the headquarters of Motorola for the Chinese market, there is no need to carry out a

separate process of reverse knowledge transfer, as no expansions are envisaged that are not conducted through its own wholly-owned subsidiary. On the contrary, the joint ventures all carried out reverse knowledge transfer, but in different styles. VW applied its acquired knowledge (management skills and social knowledge) and the tested management systems from Shanghai VW to its only one new joint ventures, FAW-VW. For its part, Alcatel Bell applied its acquired knowledge in another six joint ventures that it established after Shanghai Bell, clearly on a larger scale. Chrysler, the foreign parent of Beijing Jeep did not re-use the reversely transferred knowledge in the Chinese market because it did not establish any more joint venture at all. Government support has been cited as the chief external factor affecting knowledge transfer and utilisation in the four firms. But, unlike in the case of Shanghai Bell, where both central and local governments are direct stakeholders, local governments have played a nurturing part in the establishment of the firm competitiveness of Shanghai VW, Beijing Jeep and Motorola (China).

Differences can still be found among the firms in the three categories of competitiveness. It seems, the general tendency is that the higher the foreign ownership, the higher the score of the firm's competitiveness. Motorola (China), a full member of Motorola family, is the highest ranked among the four. Inheriting its strength directly from its parent. Motorola (China) is now, after a shorter period of establishment, at the same level as Shanghai VW and Shanghai Bell in terms of "competitive performance". Even more outstanding are the firm's "management process" and "competitive potential", if compared with any of the three joint ventures. If Shanghai Bell and Shanghai VW want to remain key players in the

Chinese market, it seems much more needs to be done to promote management effectiveness and the strengthening of R&D capabilities, which is the main indicator of competitive potential. Beijing Jeep, is now scored lower in all the three categories than the two fellow joint ventures. This reflects the relatively poor performance of this firm in the currently troubled Chinese automotive market.

Fewer differences can be established in a comparison of the two industries. One of them, however, is the difference in the positioning of training within the business strategy of the Chinese affiliates. It is a clear indication of the fast pace of technological innovation and fierce competition characterising in the telecommunications industry since the 1980s that the two firms in the telecommunications equipment industry seemed to emphasise training more as a way of strengthening their general competitiveness as compared with the two in the automotive industry. As a result, more frequent and intensive post-employment training programmes have been arranged in Shanghai Bell and Motorola (China). Shanghai VW and Beijing Jeep contrast in that relatively fewer training programmes have been provided, while there is a tendency towards pre-employment training. This may be an industry-specific difference in the nature of the two industries.

The other difference identified between the industries relates to further knowledge transfer – where extensive knowledge transfer carried out by Shanghai Bell and Motorola (China) to their own subsidiaries and suppliers is witnessed, but only modest knowledge transfer was reported to have taken place between Shanghai VW and Beijing Jeep and their major suppliers. Shanghai Bell and Motorola regarded

further knowledge transfer as part of an integrated strategy based on affiliate growth, while Shanghai VW and Beijing Jeep perceived it as a vehicle for tightening quality control and achieving cost competitiveness. This is also a result of the industry-specific difference between the two industries, for example in respect of setup cost and different levels of production for achieving economies of scale, as well as government restrictions on the automotive industry, as discussed in Section "7.241 Further knowledge transfer from the four firms to their own affiliates".

On the other hand, no systematic differences have been found between the two European firms and their counterparts from the USA. This suggests that country of origin has not played an important role in creating differences between these MNCs, headquartered in the western industrialised countries, in their knowledge utilisation in the Chinese market. However, it seems possible that the organisational form does play a role, i.e., the use of whole ownership (where permitted) as opposed to JV – as in the case of Motorola. To the extent that the American firms may have a preference for whole ownership, it may result in some difference in performance in general by nationality – although this cannot be investigated in this study.

Although it would have been desirable, no comprehensive comparison could be carried out on MNCs' knowledge transfer and organisational learning as between China and other transitional economies owning to the lack of similar research on the latter[41]. While acknowledging that more differences must exist, we can draw no firm

[41] Exploratory research by Clegg, Kamall and Tan (2000) suggests that where government policy is very liberal towards FDI, and radical change in domestic industry is required, wholesale foreign acquisition of the leading firm is seen as the fast route to knowledge transfer and competitiveness. Clearly, owning to the scale and political differences, China cannot entertain such policies.

conclusions in this respect except recognising the different practices arising from cultural differences between the two sides. This has been complicated by the persistence of the legacy of the old communist regimes, and the erratic development of market-based systems, in the Central and Eastern European countries in which FDI takes place.

Having examined the whole process of knowledge transfer and organisational learning in these four firms, a related issue worth exploring is the dynamics in the evolution of the knowledge transfer and organisational learning in the Chinese market. According to Hyder and Ghauri (1989), the reason to form a JV is to gain complementary resources from each other and an important characteristic of resource exchange is its dynamic nature. In the four firms studied it is clear that the driving forces behind the knowledge transfer are two fold:

First is the Chinese government's intention of transferring advanced western technologies and management skills to upgrade the Chinese indigenous industry and strengthen China's international competitiveness in knowledge intensive industries. This has been reflected in the favourable environment created for knowledge transfer in the two industries of this research, such as the green light for foreign involvement in the industries, tax breaks, priority of allocating foreign exchanges, flexible employment regulations, and the extensive government supports enjoyed by the firms concerned. The aim for providing these incentives was to engage in FDI in the first place and to expand it, making it a success in the Chinese market. Apart from the Chinese government's promotional efforts, the Chinese partners of joint ventures

also hoped to benefit from the "venture" in which they were involved. Their aim was to become high fliers in the industries concerned. At a personal level, the experience of running joint ventures in strategic industries can guarantee a bright career future for Chinese managers in running other big firms, or in gaining promotion to central ministries and local government.

Second is the desire of foreign investors to avail themselves of the potential of the Chinese market in respect of local sales (and to a lesser extent, local manpower). As market seeking is the primary motive in entering the Chinese market in the chosen industries, foreign firms needed to establish their presence in this market by transferring their existing knowledge to the new affiliates. Without the successful transfer and landing of their existing knowledge in the new affiliates, the foreign investors of the four firms in this research would be disadvantaged to compete with other manufacturers in this expanding market (which usually services this market by way of exporting, and in few cases, manufacturing licensing). It is this vision that kept the foreign parents of the four firms engaged in the lengthy, sometimes problematic, process of knowledge transfer and organisational learning.

The relationships between two parents are the other crucial dimension to look at when examining the dynamics of knowledge transfer and organisational learning in the firms concerned. On the face of it, it is clear from our interviews that the two parents have not got directly in touch with each other often after the signing of the respective joint venture contracts. Their interests have been represented, and their views aired, by their directors in the Board, and their managers and expatriates in the

management team. As would be expected, all the relevant business has been conducted within the joint venture concerned. This is in line with international practice. Hence, the direct relationship between the two parents is very limited. There is no record indicating that the parents of the three joint ventures in this study have engaged in more co-operations.

However, the managing of knowledge transfer and organisational learning in joint ventures is really a crusade of handling relationships between two parents of these firms. Although the Chinese parents own the majority of equity in their joint ventures, such as Shanghai Bell and Beijing Jeep, or at least share with the foreign parent sometimes, such as in the case of Shanghai VW, their influences have been seriously offset by the foreign parents due to their possessing of knowledge-based firm specific advantages for which the joint ventures sought. In order to proceed in conducting knowledge transfer and achieving firm competitiveness, all the parties involved had to work together, making compromises and accommodating each other. This research has found, as indicated in Sections "7.3 The key factors in the knowledge transfer and organisational learning process" and "7.4 The impact of the Chinese business environment on knowledge transfer and organisational learning", that shared mindset and trust between parents of joint ventures are essential to enabling knowledge transfer and organisational learning, and foreign parents need to take special attention of the cultural differences in the Chinese market ("cultural awareness"), pursuing long-term vision rather than short-term gain. The success of these firms has therefore largely been built on shared mindset and trust between the Chinese and foreign parents. This is consistent with the previous findings on joint

venture partner relationship in general, such as the development of a trustworthy interpartner relationship is critical to the venture's operation (Faulkner, 1994), and the interpartner co-operation and mutual adjustments represent an inevitable solution to address unexpected challenges over time (Yan and Gray, 1996). It is extremely similar to the findings on joint venture partner relationship in the context of knowledge transfer and organisational learning by Inkpen (1995b: 67), who argues that trust between JV partners and relationship openness are important elements of long-term JV relationships. This further demonstrates the validness of the relevant findings of this research.

Along with the progress made in knowledge transfer and organisational learning, the relationships between parents and their affiliates also evolve. On the one hand, the affiliates have become increasingly autonomous. This is evidenced in the fact that fewer expatriates are employed now in these affiliates than in the past (after carrying out management localisation programmes), and the transfer of the majority of component suppliers from foreign parents to local manufacturers following lengthy localisation programmes. The explanation for the increasing autonomy in these affiliates may lie in the improvement of their competitiveness in the Chinese market. This is consistent with the finding of Glaister, Husan and Buckley (1999: 20) that foreign parents allow IJV autonomy as long as performance is acceptable to them. On the other hand, both foreign and Chinese parents have become increasingly dependent on these affiliates in the Chinese market. For the foreign parents, these affiliates represent their hope of realising their ambitions in the fast growing Chinese market. They also rely on these affiliates as customers, to which they export

intermediate goods. Although in decline recently, the jobs of thousands of people in their home countries rely on these export. Chinese parents also rely on these affiliates for the acquisition of management skills and social knowledge. These new developments indicate that the importance of the affiliates is rising for the MNCs in this study, which is consistent with research of Prahalad and Doz (1981), Taggart (1996) and Young, Hood and Dunlop (1988). The foreign parents of these affiliates have employed strategic control, exercised both directly and indirectly (Hill, 1999) in order to perpetuate success in the Chinese market (notwithstanding that Beijing Jeep has recently performed poorly). Direct control is achieved in the affiliates of this research through sending expatriates to fill in those positions designed to be held by managers from foreign parent, and indirect control is achieved by the dissemination of corporate culture, which was referred to as a "secret weapon" of MNCs by a Belgian manager (See Section "6.31 The typology of the transferred knowledge"). This again confirms the findings of Hill (1999) and Gupta and Govindarajan (1991).

The above findings do have significant theoretical implications. First, they take us beyond the mainstream theory, which regards knowledge transfer as primarily one-way process, whereby the knowledge asset advantage of the parent compensate for the 'cost of foreignness' in the host economy (Hymer, 1960, 1976; Dunning, 1977, 1993). It is now clear that organisational learning is the key to the establishment of affiliate competitiveness by MNCs in the transitional markets. Although some research has established that organisational learning is the cornerstone of building up firm competitiveness in the developed markets (Edmondson and Moingeon, 1998;

Hamel, 1991; Hamel, Doz and Prahalad, 1989; Kogut and Zander, 1992; Levinthal, 1991; Lyles and Baird, 1994; Lyles and Schwenk, 1992; Porter, 1991), this research clearly demonstrates that organisational learning plays the same role in China, one of the largest transitional markets. This indicates that organisational learning is of universal importance to firms wherever they operate. In this way, it may be taken as an example of the impact of globalisation on international business. In order to extend their global competitiveness into transitional markets, MNCs need to put organisational learning at the heart of their business strategy, and create a favourable environment where internal organisational learning of both transferred knowledge and local knowledge can flourish and be sustained.

Second, organisational learning is a complicated process, which needs to be cultivated by all the parties involved in the affiliates. There are plenty of academics and practitioners who perceive organisational learning as critical in nurturing and maintaining firms' comparative advantage (De Geus, 1988; Nevis, Di Bella, and Gould, 1995). However, how organisational learning is actually worked out in a MNC remains arcane in many respects. Some recent research, e.g., Inkpen (1995b), Hedlund and Nonaka (1993), explored the process of organisational learning and originated ideas about the main stages that it comprises (as in the scheme proposed by Hedlund and Nonaka (1993: 126) and used in this chapter). Yet, they are entirely based on cases in the developed markets, such as Inkpen's (1995b) research on Japanese investments in the North American market, Nonaka and Takeuchi's (1995) investigation into Japanese firms. This research has furthered current research on organisational learning by presenting a detailed analysis on the specific sub-stages of

the whole process based on multiple case studies. It also identified the key factors affecting the organisational learning process in the distinctive Chinese market. Our study concludes that foreign investors must obtain trust and cooperation from the Chinese stakeholders to enable knowledge transfer and organisational learning to proceed smoothly. This has provided a stepping stone in understanding the complexities of managing knowledge transfer and organisational learning process within MNCs in the global marketplace. The key point is that the process has dimensions that are external as well as internal to the firm. Indeed, the external dimension could be argued to be more important when entering transitional markets such as China, than when entering the developed economies.

Third, cultural issues matter hugely in the process of knowledge transfer and organisational learning carried out by MNCs. It is a recognised weakness of the JV literature that it has least to say about the process of JVs (Parkhe, 1993). A striking example is the subject of national cultural differences (and the effects of these on IJV performance). This topic has been the focal point for controversy in the mainstream JV literature (Geringer, 1998; Glaister and Buckley 1998a and 1998b). Cultural issues, however, were not ignored in this research. It is certain that, given the fact that there are a great deal of culture-related differences found between China and the western countries, foreign investors have to be very cautious when progressing their operations inside China. There are many factors that need to be carefully evaluated before, and after, FDI has taken place. They are not only quantities such as market size and expected market growth, but also the sources of country risk (political risk, economic risk, etc.), plus the classical locational and

production factors such as inflation, wage costs, skills (human capital), infrastructure, technical capital, government policy towards FDI, trade barriers, exchange rate, as well as monetary and other macroeconomic factors. On top of all these factors, cultural issues influence the processes that are crucial to the progress of the affiliate and the perception of them.

Chapter 8 Conclusions

8.1 Main findings and managerial implications

The objective of this research was to expand and deepen the conventional academic approach of technology transfer to that of knowledge transfer. The basis for this is that FDI, in the modern theory of international business, is a complex transfer and interaction of resources beyond that of mere technology transfer. Indeed, technology transfer relies on the transfer of other resources in order to succeed. Accordingly, this research sought to analyse the process of MNC's knowledge transfer and organisational learning by which foreign affiliates develop from "fresh" entrants to becoming competitive players in China's telecommunications equipment market and automotive market. In particular, it intended to address the following questions: What knowledge has been transferred by the MNCs into the Chinese market? How has the knowledge been transferred? And how has the transferred knowledge been utilised? It also sought to review the impact of the distinctive characteristics of the Chinese market on MNCs' knowledge transfer and organisational learning practices.

This chapter intends to evaluate the whole research against the objectives set beforehand, i.e., to:

- analyse the process of knowledge transfer and organisational learning by addressing the following questions: What knowledge has been transferred by the

MNCs into the Chinese market? How has the knowledge been transferred? And how has the transferred knowledge been utilised?

- review the impact of the Chinese business environment on MNC's knowledge transfer and organisational learning practices

First, prior to tackling the above questions themselves, we examined some strategic issues of these four firms with regard to their entry into the Chinese market. This research reveals that the strategic motive for FDI in entering the Chinese market within these two industries is primarily local market servicing. The rents that accrue from the transfer of knowledge to the affiliates of these MNCs in China and the benefits arising from component supply are therefore important elements for the firms' consideration. In order to make FDI successful, this research also suggests that foreign firms must find an optimal entry mode to cope with the regulated Chinese market. The fact that three out of the four firms chose joint venture as their entry mode, reflects the restrictions imposed by the Chinese government in the 1980s on the one hand, and the risky nature of this market on the other. Joint venture was regarded as a way of securing local cooperation to mitigate country risk, itself strongly associated with the 'cost of foreignness' specific to foreign firms (Hymer, 1960, 1976; Dunning, 1977, 1993).

The Chinese firms engaged in the joint ventures had different intentions from those of their foreign partners. They wanted to seek access to the strategic assets held by the foreign firms, such as technological advantages, financial resources, and management skills (although the importance of the last is often only fully realised

later). This was evident in the fact that only the most advanced products of foreign partners were expected to be introduced by the Chinese partners. Given the bad record of intellectual property protection in China, it begged the question of how the foreign partners could limit the "bleedthrough" of their input knowledge in the process of running joint ventures. This research indicates that one way employed by the firms of this investigation is through designing the structure of corporate governance to achieve a division of management control within the firms concerned that preserves the value of their ownership advantages.

Second, we addressed the three questions about the process of knowledge transfer and organisational learning by the four MNCs in China. Regarding the knowledge that has been transferred by the MNCs into the Chinese market, the findings from this research clearly demonstrate that the transferred knowledge to the Chinese affiliates is composed of technology, management skills and social knowledge. Social knowledge plays an important role in shaping the vision and atmosphere of newly established affiliates. In order to better exploit the opportunities arising from the expanding Chinese market, foreign parents transferred a broader range of knowledge than just production related technologies. Among the three joint ventures, the knowledge transferred to the Chinese market has been found to have a stages characteristic. From our investigation, the firms were found to transfer the different types of knowledge at different stages, even though some of them had intended to carry out the transfer of different knowledge types simultaneously.

Regarding the second question, i.e., how has the knowledge been transferred by the MNCs into the Chinese market, some illuminating findings have been gained. The way in which MNCs transferred knowledge was examined by looking at the following issues: transfer mode, transfer route, transfer volume and transfer cost. It is evident that the more tacit is the knowledge concerned, in terms of codifiability and teachability, the stronger the incentive to transfer across national boundaries to a wholly-owned subsidiary (where permissible) than through a joint venture. To facilitate knowledge transfer and localisation of production, foreign parents always sent expatriates to their affiliates in the Chinese market, in addition to the normal routes such as the transfer of documentation and training programmes. Foreign expatriates can provide important on-site support to ensure that the recipient company can acquire and utilise the transferred knowledge much more effectively and efficiently.

In terms of the volume of knowledge transfer, this research reveals that both the knowledge gap between foreign parents and their joint venture affiliates, and the competitive strategy of the parent firms in the host market, played important roles in deciding how much knowledge (including management skills and social knowledge) was transferred to the Chinese affiliates among the four firms concerned. Notably, knowledge flows from the parent to the affiliate might be increased to include the latest technological and managerial expertise if the affiliate faces declining market power (i.e., increasing market competition). And finally, this research confirms the findings of relevant studies conducted in western countries in respect of the cost of knowledge transfer to the Chinese market. These are that, the complexity and

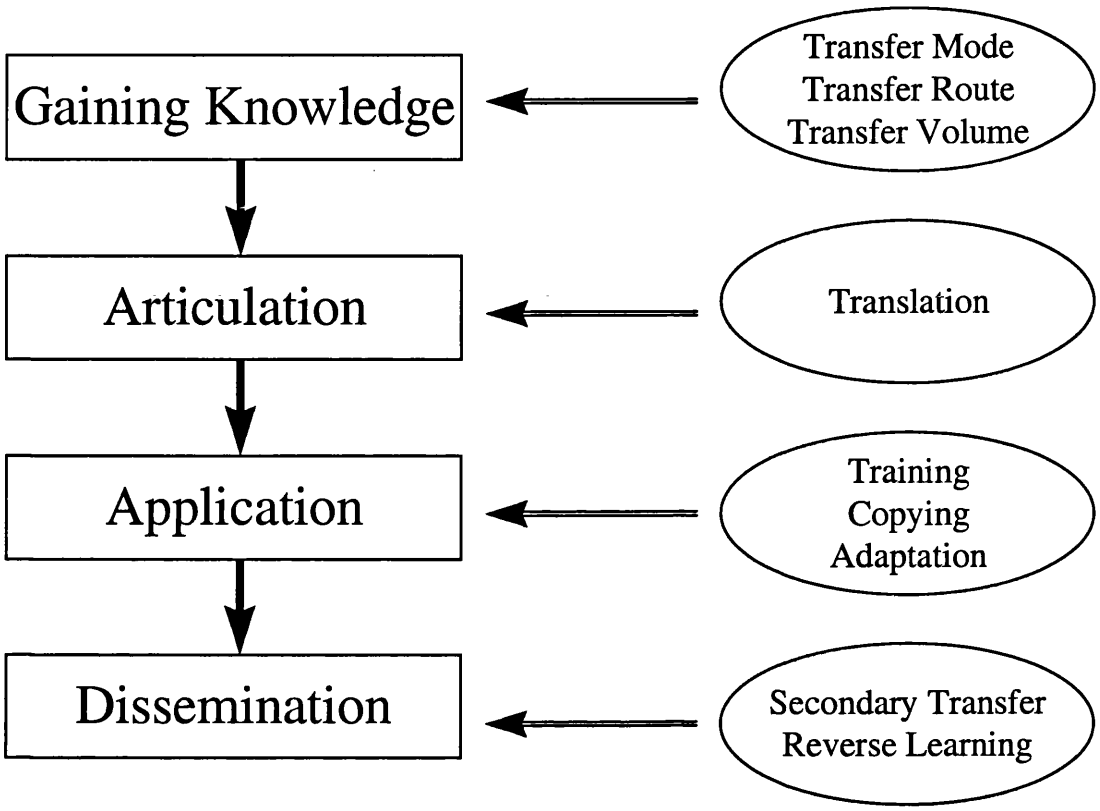
tacitness of the transferred knowledge, the financial and human resources committed by the parents, and the absorptive capacity of affiliates in the host market, were key elements that affected the cost of knowledge transfer within the relevant MNCs (Kogut and Zander, 1993; Contractor and Lorange, 1988; Teece, 1977; Lan and Young, 1996). However, further research is still needed to examine these elements individually for a better understanding of their role in influencing the volume of knowledge transfer by MNCs in transitional markets.

How has the transferred knowledge been utilised? This research has established that the transferred knowledge has been utilised by the four recipients through a lengthy process of organisational learning, which is composed of knowledge articulation, knowledge application and knowledge dissemination. The stage of knowledge application is further divided into training, copying and adapting. Knowledge dissemination further comprises secondary knowledge transfer to the affiliates of the four primary recipient firms. Finally, there occurs further transfer back to the Chinese and foreign parents of new output knowledge created in the affiliates, a practice referred to in this research as 'reverse-learning'. This research has also identified the key elements in the process of knowledge transfer and organisational learning: training, team, and absorptive capacity. Training ensures the provision of qualified staff and the dissemination of parent corporate culture. Teams can underpin knowledge transfer and organisational learning, and are central to promoting the absorptive capacity of the recipient. Absorptive capacity decides the efficiency and effectiveness of knowledge transfer and organisational learning.

The aim of knowledge transfer and organisational learning carried out by the four MNCs is to consolidate the competitiveness of their Chinese affiliates. This research argues that an objective indication of the successful utilisation of the transferred knowledge is the further transfer of the gained output knowledge from these primary recipient firms to their own affiliates in the Chinese market, and from the primary recipient firms to their Chinese and foreign parents through reverse-learning. It has been found that knowledge obtained through reverse-learning by the foreign parents from their affiliates was re-used in later market entry by other affiliates of the same parents in the Chinese market, such as in the case of Alcatel Bell and Shanghai VW. This insight into the dynamics of knowledge transfer and organisational learning provides substantiation of the stages view of the FDI process, which posits incremental increasing commitment by the investing firm (Johanson and Vahlne, 1977).

Hence, the process of knowledge transfer and organisational learning by the four firms in the Chinese market can be illustrated in the following figure.

Figure 8-1: The process of knowledge transfer and organisational learning by the four MNCs in China



Third, the last question regarding the impact of the Chinese business environment on MNCs' knowledge transfer and organisational learning was also evaluated. A typical characteristic of transitional markets is environmental uncertainties, including host government interference in the case of China. This research has established that market size and access to the Chinese market, government industrial policy, the existence of the Communist Party and its subordinate organisations in the joint venture affiliates of those MNCs involved, Chinese culture, the quality of the Chinese employees, and the rivalry among local governments, were found to have had a clear impact on the strategy and behaviour of MNCs in the Chinese market. In the face of the complexity of economic and cultural differences between foreign and Chinese partners, this study concludes that a shared mindset needs to be cultivated,

and trust needs to be engineered between the partners in joint ventures located in the Chinese market, to ensure the smooth transfer, assimilation and adaptation of the proprietary assets from headquarters. Moreover, cultural awareness, government support and long-term vision were deemed to be specifically linked to carrying out knowledge transfer and organisational learning in the Chinese business environment. We conclude that failing to address these issues before and during a proposed knowledge transfer will bring great difficulties to the process of grounding the transferred knowledge in the recipient, potentially causing substantial loss of the resources invested and resulting in low morale among the employees concerned. The above finding has been supported by a recent survey conducted by KPMG (1999) in its investigation of German investment in China.

Last, this research also examined the impact of knowledge transfer and organisational learning on the competitiveness of the MNCs' affiliates in the Chinese market. It is apparent that there is a positive relationship between performance in knowledge transfer and organisational learning and affiliate competitiveness. This research has confirmed that the improvement of firm competitiveness can be measured by various indicators of the firm's competitive performance, competitive potential and the management process (Buckley *et al*, 1992). If we compare the four firms, Motorola (China) was the champion in each of the competitiveness categories, while Beijing Jeep performed poorly owning to various internal and external reasons, while Shanghai Bell and Shanghai VW were in between. It is evident that the efficiency and effectiveness of knowledge transfer and organisational learning contributed greatly to the differences observed between

them. In this research, we also notice that the performance of these international joint ventures in the Chinese market has been preferentially assessed subjectively (in the opinions of the parents), rather than objectively (in terms of financial results).

Comparisons have been made to examine the practices of knowledge transfer and organisational learning of these four firms in China's telecommunications manufacturing industry and automotive industry. This research has established that, though different in terms of technological sophistication, the common themes for the four firms with respect to knowledge transfer and organisational learning are: how to secure the most favourable environment in the host market by making a well-judged strategic decision on entry mode; how to carry out knowledge transfer and organisational learning effectively to achieve improved and sustainable performance on the part of the firm in the Chinese market; how to deal with the environmental uncertainties presented by the host market that affect the organisational learning process; and how to adapt appropriately to the local culture.

In addition to the commonalties, some significant differences were found between the Chinese affiliates of the four MNCs. These include "choosing" different entry modes (joint venture vs wholly-owned subsidiary), selecting products of different levels, and the fact that the Chinese Communist Party operates its command structure in joint ventures, so influencing decision making processes – but not in the wholly-owned subsidiary. A notable contrast was that knowledge in more than one line of business was transferred to the wholly-owned subsidiary, but knowledge of only one line of business was transferred to the joint ventures. This research has

revealed that there is a stages characteristic to be found in the primary knowledge transferred to the three joint ventures, but not to the wholly-owned subsidiary. This indicates the gradual realisation among the joint venture partners of the importance of management skills and social knowledge for the success of doing business in the Chinese market. These three joint ventures all subsequently transferred more types of knowledge than were originally negotiated to address the imbalance between technology and the soft natured knowledge which was in deficit.

Differences also exist regarding the way the knowledge transfer was handled between these firms. Apart from employing different knowledge transfer modes, the role of the expatriates was also different between the joint ventures and the wholly-owned subsidiary. Those deployed to joint ventures were not only there to facilitate knowledge transfer, but also to guard against any possibility of the leakage of intellectual property owned by the foreign parents. This demonstrates the complication of managing partner relationships for foreign investors in the Chinese market. In addition, the means of overcoming language problems differed as well between the joint ventures and Motorola (China) – the only wholly-owned subsidiary. The joint ventures set up documentation or translation centres to address language differences, while Motorola (China) dealt with it solely through selective recruitment and training programmes, over which it had sole discretion through its 100 percent ownership. In comparison, training in Motorola (China) is more systematic and intensive than in its joint venture counterparts. A contrasting localisation approach was adopted by affiliates in the two ownership categories: the three joint ventures started manufacturing localisation by adapting the easier

elements first (called the 'from-easy-to-difficult approach' in this research), while Motorola (China) has integrated R&D development with its organisational learning. And finally, the four firms accomplished divergent performances in the three categories of competitiveness, partly as a result of differences in respect of knowledge transfer and organisational learning. It seems that there are reasons to believe that higher foreign ownership facilitated the achievement of a higher score in terms of competitiveness.

There are also some differences with respect to knowledge transfer between the telecommunications manufacturing industry and the automotive industry of China. First, different vintages of technologies were transferred to these two industries. Motorola (China) and Shanghai Bell transferred the latest technologies in response to the fast pace of technological innovation and fierce competition of the Chinese market. However, only modest (very mature) technologies were transferred to their Chinese affiliates by VW and Chrysler[42] against the background of a highly regulated and protected automotive market. Second, the volume of the transferred knowledge in the telecommunications manufacturing industry was much greater than in the automotive industry. Third, labour cost did have some significance in the investment decision of the automotive industry, where China provided a locational attraction in respect of its internationally low real wage costs, but not in the telecommunications manufacturing industry. In the telecommunications

[42] The main technology transferred to Beijing Jeep was developed by American Jeep, which was acquired by Chrysler in 1987. Chrysler has continued to meet the obligations defined in the original joint venture contract signed in 1984. The technology in question was very advanced when Beijing Jeep was established. However, due to its weak absorptive capacity, Beijing Jeep has only managed to localise the original technology which became outdated since the end of the 1980s.

manufacturing industry the proportion of labour costs in total cost was too low for this to materially affect the investment decision.

In addition, some differences have been found between the two industries regarding the process of organisational learning. The two firms in the telecommunications manufacturing industry seemed to regard training as a way of strengthening their general competitiveness, and as a result, more frequent and intensive post-employment training programmes were arranged. Shanghai VW and Beijing Jeep of the automotive industry contrast in that relatively fewer training programmes were provided, while there was a tendency towards pre-employment training. The other difference identified between the industries relates to secondary knowledge transfer. Although extensive knowledge transfer carried out by Shanghai Bell and Motorola (China) to their own affiliates and suppliers was witnessed, only modest knowledge transfer was reported to have taken place between Shanghai VW and Beijing Jeep and their major suppliers. Shanghai Bell and Motorola (China) regarded secondary knowledge transfer as part of an integrated strategy based on affiliate growth, while Shanghai VW and Beijing Jeep perceived it as a vehicle for tightening quality control and achieving cost competitiveness. This is also a result of the industry-specific difference between the two industries, for example in respect of setup cost and different levels of production for achieving economies of scale (as discussed in Section "7.241 Further knowledge transfer from the four firms to their own affiliates"), as well as government restrictions on the automotive industry.

This research has found no systematic differences between the two European firms and their counterparts from the USA. No evidence is found to support that country of origin played an important role in creating differences between these MNCs in their knowledge transfer and utilisation in the Chinese market. Of course, all four firms are headquartered in the western industrialised countries, which does give them something in common. However, it seems possible that the organisational form does play a role, i.e., the use of whole ownership (where permitted) as opposed to JV – as in the case of Motorola. To the extent that the American firms may have a preference for whole ownership, this may result in some difference in performance in general by nationality (Dunning, 1958). This needs to be investigated further in future studies on this topic.

What are the differences between China and other transitional economies with respect to knowledge transfer and organisational learning? Based on the very limited research carried out on transitional economies of Eastern and Central Europe, it is difficult to conduct any comprehensive comparisons. However, it seems that one thing is clear. While Chinese firms have always sought to start with transferring the hard elements (technological) of knowledge, firms in other transitional economies in Europe have been more ready to prioritise the soft elements of knowledge on their transfer lists. This is due to the different existing technological capability between China and these countries. It may also owe something to the strength of the government view that technology is a priority, as the government still wields more power in China (as a one-party state) than in most countries. More different practices in knowledge transfer could be identified in a future study. For instance, it is

possible that the cultural differences between China and the transitional economies in Eastern Europe are important, as the latter have been affected by the transition from the old communist regimes to market-based capitalist systems.

It needs to be acknowledged, however, that by no means all of the above findings are generally applicable outside the cases under study. First, and having said that, even though all the findings from this research were drawn from cases in the telecommunications manufacturing industry and the automotive industry, no findings are regarded as exclusively industry-specific. To some extent other industries of some sophistication are likely to share common features. However, it would be inappropriate to apply them in industries of less-knowledge intensity, such as toys, food and the mining industries. Second, some of the above findings are more pertinent to transitional markets. This includes how to secure the most favourable environment in the host market by making a well-judged strategic decision on entry mode, where the environment is determined more under the discretion of the government. It also includes the finding that foreign investors seek to limit the "bleedthrough" of their input knowledge in joint ventures to the government sector enterprises by way of designing the structure of corporate governance. The stages characteristic that appeared in the process of knowledge transfer is more likely to be found in transitional economies than in developed markets. This is because the degree of uncertainty and lack of local market familiarity is greater, meaning commitment is likely to change more with local experiences as local learning takes place. Third, cultural awareness, government support and long-term vision were deemed to be specifically linked to carrying out knowledge transfer and

organisational learning in the Chinese business environment. While foreign investors need to deal with these issues in other transitional economies (or even in some developed economies, such as Japan), the combination of these three factors are considered to be most peculiar to China.

In the process of exploring MNC's knowledge transfer and organisational learning in the Chinese market based on the existing theoretical paradigm, we found that this paradigm, in most cases, is applicable in China. Wherein its weakness lies in this transitional market is that: (1) it did not give enough weight to some of the factors identified to be crucial for the success of knowledge transfer within MNCs, such as shared mindset, training, and adaptation; (2) it gave too little attention to addressing the enhanced role of social knowledge in contributing to the transferring and grounding of technology and management skills. This reflects the parallel processes of knowledge transfer and organisational change, and, understandably, some of the issues related to the host environment, such as the impact of government support, cultural awareness, the role of the Chinese Communist Party in the operation of joint ventures; (3) it failed to identify the specific steps within each stage of the organisational learning process. This research has striven towards addressing these weaknesses, or filling the gaps in the current paradigm, as described below, to improve our understanding of MNCs' internationalisation in transitional markets.

Certain aspects of the research have emerged as being original:

- To our knowledge, this research is the first to put forward, and to test, that transferred knowledge includes not only technology and management skills, but

also social knowledge. Compared with technology and management skills which are commonly referred to as the main elements transferred within MNCs, social knowledge actually plays a much wider role in equipping the employees of the recipient firms with the kind of mindset, corporate culture, internal language and other tacit knowledge that are required to undertake the identification and establishment of firm-specific advantages in a challenging environment. These have been considered by the firms concerned to be a "secret weapon" in realising a firm's competitiveness in the host market. Firm competitiveness in transitional markets depends on the totality of the transferred knowledge.

- When examining the factors that decide the volume of the transferred knowledge by MNCs into the Chinese market, we identified the size of the host market concerned as a prime factor in expediting the knowledge transfer, even though there are quite a number of uncertainties pending in this market. This is likely to be an indication of the extent of competition in world markets that market share and growth has become vital for MNCs' existence and development.
- We have inferred that knowledge utilisation is a natural continuation, but also an integral part, of knowledge transfer, and group them together in the focus of this research. This has helped to ensure that a full picture of the issues concerned with MNCs' knowledge transfer was presented, and provides a thorough understanding relating to the building up of firm competitiveness in the Chinese market. This systematic approach is a contribution to the research on knowledge transfer within MNCs.
- We identified the specific steps within each stage of the organisational learning process (comprising knowledge articulation, knowledge application and

knowledge dissemination) put forward by Hedlund and Nonaka (1993). We found in this research that knowledge application is further divided into training, copying and adapting. And knowledge dissemination comprises secondary knowledge transfer from the four affiliates under study to their own affiliates, plus further knowledge transfer from the four primary affiliates to their Chinese and foreign parents, a practice referred to as reverse- learning in this research (which will be discussed in the next point). Key elements significant in this process such as training, team, and absorptive capacity, were individually examined; host business environmental factors affecting the performance of knowledge transfer and organisational learning by MNCs, such as cultural awareness, government support and long-term vision, were highlighted. The further breakdown of the stages in the organisational learning process provides a stepping stone in understanding the complexities of managing knowledge transfer and organisational learning processes within MNCs in the global marketplace and specifically in China where MNCs' uncertainty about the local environment is a distinctive factor.

- In this research we examined secondary knowledge transfer from MNCs' affiliates, i.e., Shanghai Bell, Shanghai VW, Beijing Jeep and Motorola (China), to their own affiliates in the Chinese market, e.g., in the case of the telecommunications manufacturing industry, NEAT (of Shanghai Bell) and Sichuan Leshan Semiconductor Company (of Motorola), or in the case of the automotive industry, to their first tier suppliers, following the successful knowledge utilisation and development in the four firms. Secondary knowledge transfer was also found in all four firms to their parents by way of reverse

learning. The extension of MNCs' firm-specific advantages into China, based on this three-tier (foreign parents - the four foreign invested firms - their own affiliates and component suppliers in the Chinese market) knowledge transfer and utilisation process, represents a new contribution to understanding within the international business literature on operating in transitional markets.

These findings have important implications for the internationalisation of multinational firms in transitional markets in general, and on knowledge transfer and organisational learning in China in particular. It is evident from this research that knowledge transfer and organisational learning serves as the cornerstone of firms' internationalisation processes. The deployment of firm-specific advantages across borders through a deliberate transfer and learning process, is used to ensure that multinational firms keep their niche advantages over local rivals in a diversified global market. In fact knowledge transfer has been regarded as a lifeline in the growth of multinational firms (Kogut and Zander, 1993) – a view that has been strongly supported by the cases in this research. But it also transpires from this research that MNCs do plan - and indeed should plan - to extend their primary affiliates' competitiveness to their own affiliates through secondary knowledge transfer, and to their parents through reverse-learning. The impacts of secondary knowledge transfer fall within the topic of spillover effects, which to date has not been researched in China either qualitatively or quantitatively. It is worth pointing out that the effectiveness of knowledge transfer and utilisation among multinational firms, as shown in this research, is not the same. The contrast in this respect contributed to the perceived difference in affiliate competitiveness in the Chinese

market, reflected in the different market shares, financial positions and R&D adaptations and development capabilities.

Our findings shed some light on the importance of knowledge of a soft nature for the general competitiveness of multinational firms. It is very clear from the cases investigated that each of the three categories of knowledge contributes to the successful production and delivery of the transferred product and to general firm competitiveness in the Chinese market. In fact, management skills and social knowledge weigh no less than technology in contributing to the firm's competitiveness in a new market. To some extent, it is the soft knowledge that has really transformed the management behaviour of the firms concerned, and created the corporate culture that is to a greater extent compatible with that in the western parent firms. We can conclude that in order to achieve improved performance the traditional technology-centred view should be rebalanced to reflect the unique value and inseparable contribution made by management skills. In particular this applies to social knowledge, which underpins the business operation of the newly established affiliate in transitional markets.

The finding that the volume of knowledge transfer is strongly influenced by both the knowledge gaps between foreign parents and their joint venture affiliates[43], and the

[43] The knowledge gap does not affect Motorola's knowledge transfer volume in the same way as with the joint ventures. Motorola's Chinese affiliate has been established as 100 per cent owned and as a greenfield venture. Motorola's desire has been to maximise the appropriation of returns on the firm's ownership advantages, and the transfer of knowledge to its wholly-owned subsidiary is the mechanism through which this objective is achieved. The volume of Motorola's knowledge transfer has therefore been decided by the competitive strategy of the parent firm for the Chinese market, from which ensures the need to transfer management skills and corporate culture to facilitate the newly established subsidiary becoming full member of the "Motorola Empire".

competitive strategies of the parent firms in the host market, demonstrates the dynamic nature of knowledge transfer. In fact, knowledge transfer is an on-going process of great complexity, instead of a static, pre-set, carefully-planned, journey. MNCs need to be prepared to adapt to the changing market situations in China, and perhaps other transitional economies, by committing more of their resources when involved in a knowledge transfer project. There is a natural tendency to under-invest in these on account of market uncertainty and possibly because of the fact that ownership is shared in JVs. In practice, it is likely that more investment will actually mitigate the risk and uncertainty particularly if the resources include a balanced level of investment in social knowledge and organisational capital. The key to success in a potentially huge market such as China's is in strategic judgement instead of accounting judgement, i.e., seeking long-term strategic presence and the overall financial return from it instead of short-term net gain.

This study also contributes to our understanding of the influence of the host business environment on the performance and competitiveness of MNCs in transitional markets. Various government support, as well as interference, has made the Chinese business environment very unpredictable, leaving foreign invested firms vulnerable to the changing situations in this market. In addition, given the fact that there is a great deal of cultural difference found between China and the western countries, foreign investors have to be very cautious to move forward in their operations inside China. We conclude that a wise selection of partners, cultural awareness, long-term vision and trust between Chinese and foreign investors, along with active knowledge

transfer and localisation, are the key factors in seeking a positive relationship with the host government at both the central and local levels.

8.2 Limitations and recommendations for future research

This research does, however, have some limitations that suggest future research. First, the data were collected mainly from four firms in two industries. While this is understandable in case study research (Yin, 1994: 50), the limited coverage of the data certainly will restrict the application of the research findings to a wider context. To overcome this weakness, methodologically, a natural continuation of this research is to carry out more case studies in other industries in China, and in other transitional markets, to test the findings of this research and investigate the reasons responsible for any differences that emerge. Beyond the present exploratory study, a quantitative study, based on a large questionnaire survey, would be needed to tackle the issues of knowledge transfer and knowledge utilisation within MNCs. Ultimately, to gain a more complete understanding of the knowledge transfer processes in transitional markets will necessitate the examination of processes over time. Thus, future research should combine the use of longitudinal study with the questionnaire survey method.

Second, the collected data were biased toward Chinese employees. Although great efforts were made to seek a balanced picture of the perspective of the interviewees, this was not achieved in the firms concerned, except Shanghai Bell. This was due to the very limited access and availability of foreign expatriates in these firms. It would

be ideal to visit the headquarters of the remaining three firms to record their perspective on the issues concerned. This was, however, not possible within the parameters of this research due to time limitations and especially the financial constraints attaching to Ph.D field research. The maximum external competitive funding for field research was obtained, which was just sufficient for the two field trips made. Future research should be able to address this point by adhering to an equalised composition of interviewees from foreign expatriates and local Chinese employees. This is likely to require several researchers and the raising of project finance to include extensive interviews in parents' headquarters.

Third, the firms visited have all been the beneficiaries of substantial government support given to strategic industries. This may be far different from other industries in the Chinese market, where direct government support may be much less in evidence. This limits the generalisability of our findings and their ability to reflect the full range of issues concerning MNCs' knowledge transfer in the Chinese market. More research should be undertaken in those industries that may be in a less favourable situation in terms of government support in order to assess the influence of the host government in the internationalisation and knowledge transfer process.

Apart from those mentioned above, one more avenue for future research is to further clarify the role of cultural issues in affecting the knowledge transfer and organisational learning process. It is also necessary to shed more light on the reverse knowledge transfer and utilisation carried out by parent firms. The aim here should

be to provide a more detailed conceptual grounding for, and testing of, the analytical framework presented in this study.

8.3 Summary

This thesis examines the practices of knowledge transfer and organisational learning carried out in four foreign invested firms and the impact of these processes on the firms' competitiveness in the Chinese telecommunications manufacturing industry and the automotive industry. This research is based on investigations achieved through a research process appropriate for exploratory research on new topics. It reveals that the transferred knowledge includes not only technology and management skills (as commonly known), but also social knowledge, which helps to shape the vision and atmosphere of the affiliate. A sound strategy dealing with knowledge transfer, in parallel with that of business operations, is essential to build up the capabilities of the recipient firm in the host market. In successful cases, this has been supported by a deliberate process of utilising the transferred knowledge efficiently based on organisational learning. Key factors in this process are discussed, from which we are able to derive understanding of the success factors in the development of the capabilities of these firms. The research shows that the competitiveness acquired by established foreign affiliates can be extended through secondary knowledge transfer to their own affiliates in the Chinese market, and back to their parents by way of reverse learning. The implication is that knowledge transfer and organisational learning serves as the key to multinational corporations' development in transitional markets, particularly in knowledge-intensive industries where

indigenous firms often lag far behind the developed countries in terms of technology and management.

This study is only the very beginning of tackling the role of knowledge transfer and organisational learning in MNCs' expansion into transitional markets. The findings discussed above are based on one multiple-case study, which is clearly limited. More research is needed to examine the characteristics of the knowledge transfer processes in other industries, and to explore the general framework of MNCs development in transitional markets. Specifically, great effort should be made to further clarify the role of cultural issues in affecting the knowledge transfer and organisational learning process, and to shed more light on the reverse knowledge transfer and utilisation carried out by parent firms.

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APPENDICES

Appendix I: The interviews conducted in the first field trip to China (May-July 1997)

1. The profile of interviews conducted

- *Telecommunications manufacturing industry*

Shanghai Bell	5
Motorola (China)	4
Ericsson (China)	3
NEAT (Northeastern Asia Telecom)	2
In total:	14

- *Automotive industry*

Shanghai Volkswagen	3
Beijing Jeep	3
FAW-Audi	2
Siemens Automotive Electronics	1
Shanghai Siemens Auto Motor	1
In total:	10

Total interviews conducted: 24

2. Interviewees' Profile:

- Telecommunications Manufacturing Industry

Shanghai Bell Telephone Equipment Manufacturing Co. Ltd
Madam Yin Linggu, director of the chairman's office (interviewed twice)
Mr Zheng Yulu, general manager of production department
Mr Wang Lixin, deputy manager of Beijing branch
Mr Fan Feng, general manager of Xinjiang branch

North Eastern Asia Telecommunications Manufacturing Co. Ltd
Mr Zhou Feilong, general manager (twice)

Motorola (China) Electronics Co. Ltd
Mr Bill Bowers, vice president and China country controller
Mr Liu Hui, general manager of human resources department, semi-conductor plant in Tianjin

Mr Boris Wang, Tianjin site controller
Mr Liu Hong, Tianjin site training officer

Ericsson (China) Co, Ltd
Mr P. Bjork, executive vice president
Mr Chris Chan, general manager of information department
Mr Liu Guolai, engineer, production department

- Automotive Manufacturing Industry

Shanghai Volkswagen Automotive Company, Ltd
Mr Cheng Gang, assistant to the deputy managing director & commercial executive (twice)
Mr Wu Baochang, chief engineer, production planning and coordination office

Beijing Jeep Co, Ltd
Mr Tong Zhiyuan, director of product development and quality control department
Ms Sun Ying, chief engineer, production engineering department (twice)

First Automotive Works-Volkswagen
Mr Wang Bing, director of human resources department
Mr Luan Changqing, chief engineer, forging plant

Siemens Northern Automotive Electronics Co.
Mr Paolo Petronio, general manger

Siemens Automotive Electric Motor Co. Ltd
Mr Gregory Wong, strategic planning manager, sales department

Appendix II: The interviews conducted in Antwerp, Belgium (February 1998)

Company Name: Alcatel Bell, Antwerp, Belgium
Date: 19th February 1998
Place: Company conference room
Duration: Two and a half hours (followed by one-hour informal discussion during lunch)
Interviewers: Hui Tan and Dr Jeremy Clegg

Note: This interview was kindly arranged by Mr R. Theys, a former General Manager of Shanghai Bell, after we contacted him. Four experts on knowledge transfer from Alcatel Bell to Shanghai Bell were present and Mr Morel joined the interview for a short while.

Interviewees' Profile:

Mr Chris Morel, Vice President, Switching Systems Division, Alcatel Bell

Mr Jos Caerts, head know-how and technology transfer; Bell Telephonelaan 3, Switching Systems Division, Alcatel Bell

Mr ir. Marc De Koker, project manager, factory projects and technology transfer; Bell Telephonelaan 3, Switching Systems Division, Alcatel Bell

Mr Hubert Van Potelberghe, senior sales manager China, Switching Systems Division, Alcatel Bell

Mr Jef Jacobs, programme manager China, Switching Systems Division, Alcatel Bell

Appendix III: The interviews conducted in the second field trip to China (June-July 1998)

1. The profile of interviews conducted

- *Telecommunications manufacturing industry*

Motorola (China)	2

- *Automotive industry*

Shanghai Volkswagen	7
Beijing Jeep	4
In total:	11

Total interviews conducted:	13

2. Interviewees' Profile:

- Telecommunications Manufacturing Industry:

Motorola (China) Electronics Co. Ltd
Mr Liu Hui, general manager of human resources department, semi-conductor plant in Tianjin
Mr Boris Wang, Tianjin site controller

- Automotive Manufacturing Industry

Shanghai Volkswagen Automotive Company, Ltd
Mr Wolfgang Rohroff, senior adviser, director of supply department
Mr Cheng Gang, director of public relationship
Mr Sun Changsheng, assistant to the deputy managing director & commercial executive
Mr He Xiaode, supervisor, gearbox & clutch section, product engineering department
Mrs Gu Huiqin, public relationship officer
Mr Zhang Mingshen, division manager, environmental protection section
Miss Zhang Yimin, engineer, environmental protection section

Beijing Jeep Co, Ltd
Mr Tong Zhiyuan, director of product development and quality control department
Ms Sun Ying, chief engineer, production engineering department (twice)
Mr Jiang Kuiduo, division manager, No. 2 section of production engineering
Mr Sun Jiashan, manager, localisation office

Appendix IV: The main questionnaire

Interviewee:

Name:
Company:
Position:

Date:
Place:
Duration:

B. Pre-FDI Knowledge Transfer

1. What is your position and what does your job involve? [when no internal or public documentation are available, ask the next question:] What are the main business areas of your firm? Who are your main business competitors? (*identifying the true universe of the firms in Chinese telecommunications manufacturing market*)

2. [Asking Chinese:] What is your perception of the needs of setting up joint ventures with substantial foreign participation in China's telecommunications manufacturing industry?

[Asking Foreigner:] What is the motive for your firm to be involved in the Chinese market? *(Strategic motives for FDI, such as market-seeking, cost-reduction seeking, etc.)*

3. Why was FDI chosen (in preference to the other modes -- and was FDI preceded by other forms of involvement)?

Why was a joint venture chosen? (legal requirement, business reasons, etc.)

4. What contribution to meeting these needs can be met by the strategic partners? *(Partner selection)*

5. What is the structure of corporate governance of your company? *(Management control)*

-- equity percentage
-- administration division between partners

6. What changes have been introduced to your company since the setting-up of the joint venture?

7. What has been the main influence of the foreign investors?

C. Post-FDI knowledge transfer:

Open-ended questions:

To employees of technology-related departments

1. In the past five years, what key technologies have been transferred from your parent firm to your company? When?

2. Could you please give me a general introduction on the transfer process of these technologies?

3. Could you say something on utilising these transferred technologies? What's the implication to your performance of today and future?

4. In the process of transferring and utilising these technologies, what's the influence of Chinese business environment (such as government policy, proprietary rights protection, corporation of local staff, business custom, etc.)?

To employees of non-technology-related departments

1. In the past five years, what key management expertise has been transferred from your parent firm to your company? When?

2. Could you please give me a general introduction on the transfer process of these management skills?

3. Could you say something on utilising these transferred management skills? What's the implication to your performance of today and future?

4. In the process of transferring and utilising these management expertise, what's the influences of Chinese business environment (such as government policy, proprietary rights protection, corporation of local staff, business custom, etc.)?

Semi-structured questions (It is worth noting here that I will not ask every interviewee to answer all the questions in this part. Depending on the interviewees' positions, I will only ask those that they are able to provide reliable data.):

1. **[To employees of technology-related departments:]** Along with your transferred technologies, did you transfer management skill and some tacit knowledge as well, such as corporate culture of parent firm? Any more? If you did transfer these stuff, why? Is there a stage model of transferring them? Why?

[To employees of non-technology-related departments:] Along with your transferred management skills, did you transfer some tacit knowledge as well, such as corporate culture of parent firm? Any more? If you did transfer these stuff, why? Is there a stage model of transferring management skills and social knowledge? Why?

2. (1) Among the three knowledge transfer modes, i.e., licensing, joint venture and 100% internal transfer, which mode did you choose? Why?

(2) Which knowledge transfer route did you employ (such as staff exchange, management training, books, computer software, etc.)? Why?

(3) Have you got an idea of the volume of transferred knowledge in the past five years? What's the relationship between the knowledge transfer volume and (i) the knowledge gap and (ii) competition situation in the host market?

(4) What are the main factors that affect the knowledge transfer cost? Apart from others, what difficulties have language differences brought in the knowledge transfer process?

3. (1) What are the important factors in the knowledge utilisation process of your firm? Was there any organisational changes taken place? Why? [May further ask: Who are the winners and losers of the organisational changes in your firm?]

(2) What kind of resources have you committed to ensure the knowledge transfer?

4. What's the result of utilising these transferred knowledge? What capabilities have you gained beyond the transferred knowledge? How to measure the improvement of the competitive advantage of your firm? Why? (*Performance outcomes*)

5. What's your impression of Chinese business environment after executing these aforementioned knowledge transfers?